C W Report

Chemical Week

June 30, 1956

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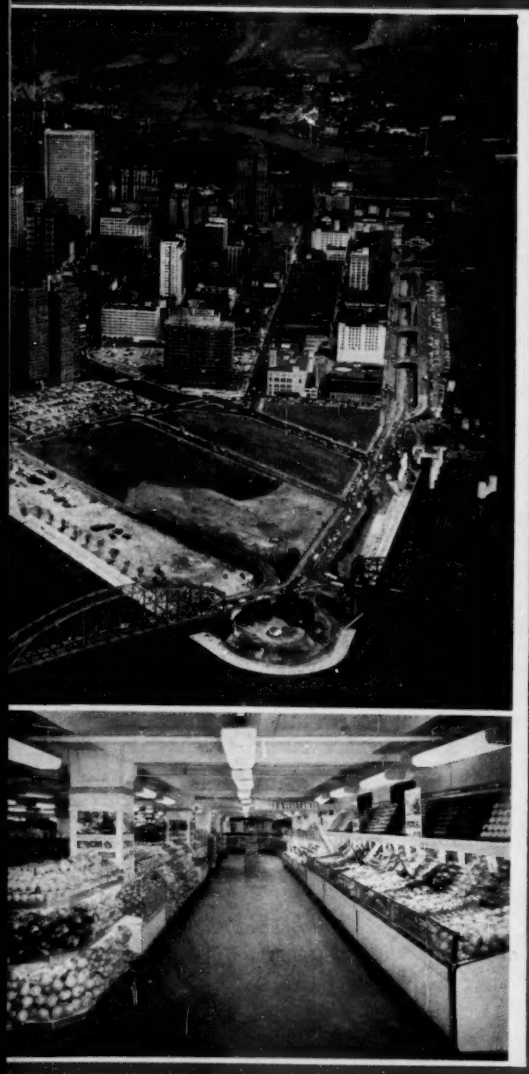

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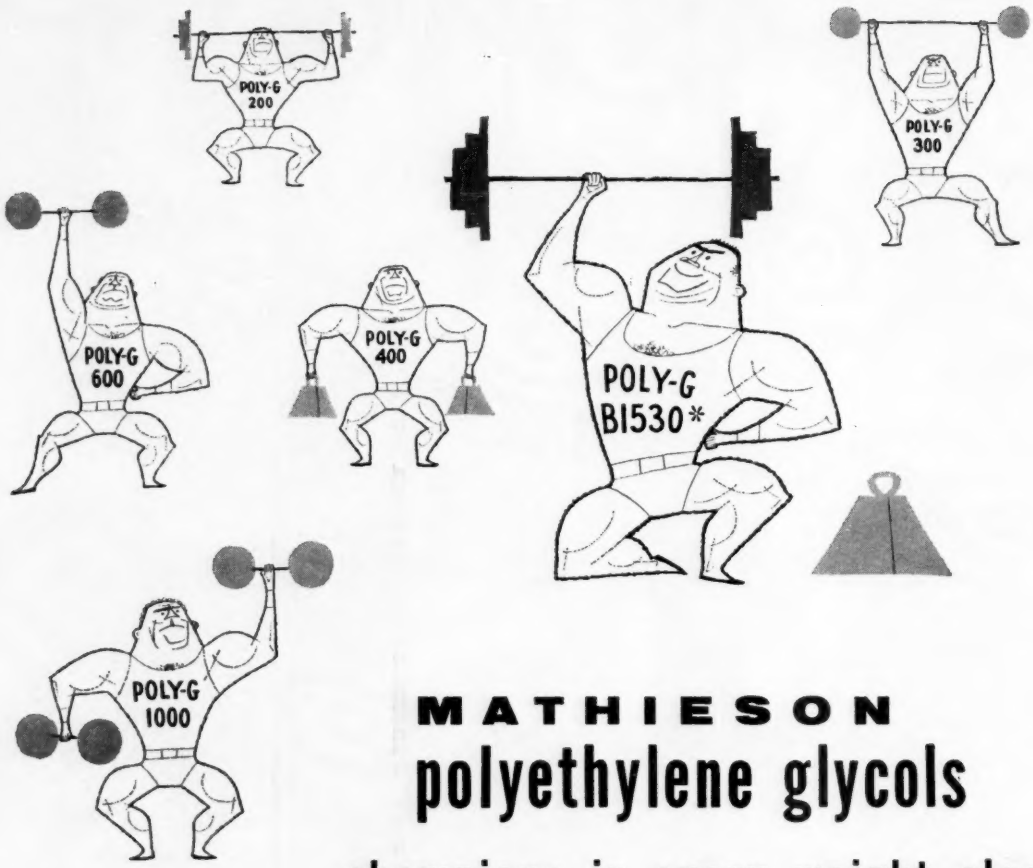

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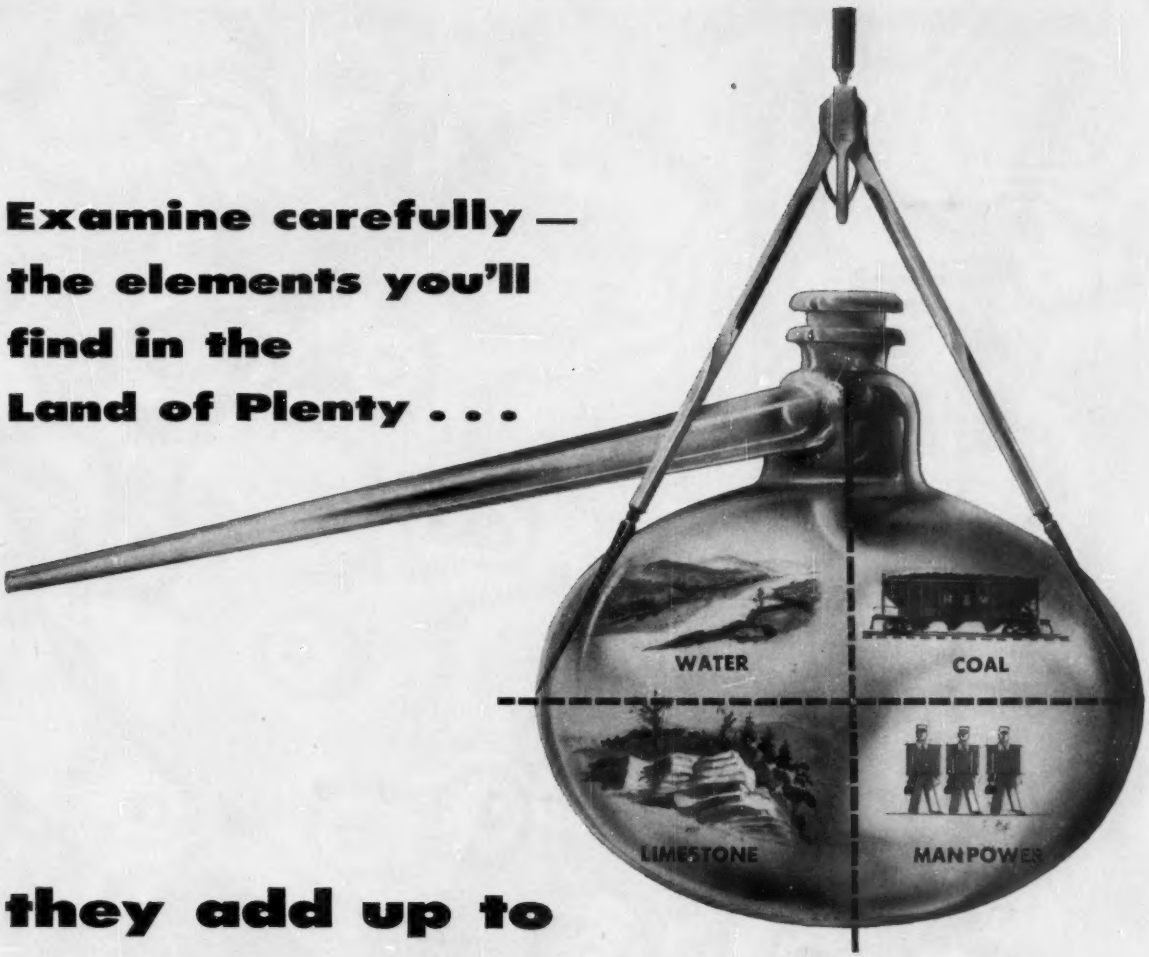

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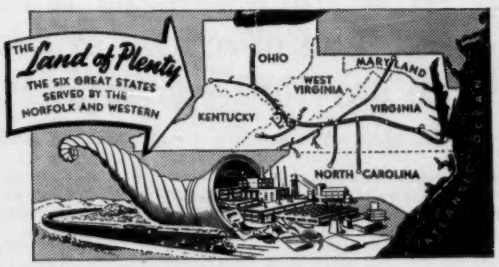

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Chemical Week

TOP OF THE WEEK

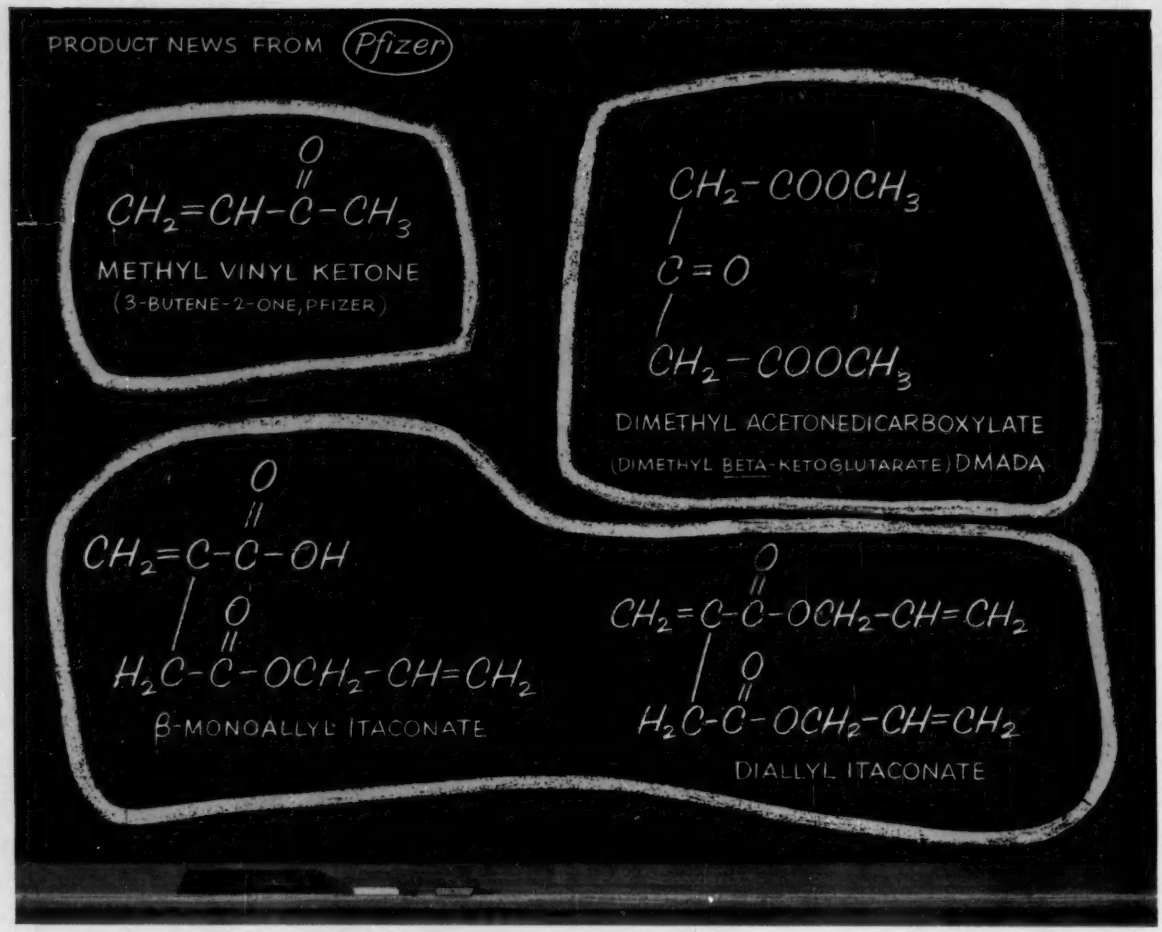
June 30, 1956

Justice Dept. sells its Rohm & Haas stock, gets biggest single payment ever for former enemy assets .. p. 22

U. S. chemical exporters hope tariff concessions coming next month will mean an end to "export complacency" in this country ..... p. 45

New enzymes put the flavor back into processed foods —but studies are still in fundamental stage ... p. 68

Keeping pots and pans shined and plastic dishes stain-free are proving to be a mighty profitable job for a host of specialties makers ..... p. 112



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Chemical Week

June 30, 1956 *Vol. 78, No. 26*

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Some stock in General Aniline & Film may go to Interhandel after all. Under a ruling made in Federal District Court for the District of Columbia, some of the 1,800 Interhandel stockholders—who intervened in the now-pending suit in which Interhandel itself asks the return of its GAF stock—may be able to get a pro rata share of the GAF stock. Affected: those of the 1,800 who bought their Interhandel stock since General Aniline was seized in 1942. If they can prove that, as individuals, they were "nonenemy-tainted" at the time of seizure, they will be entitled to return of a proportionate share of GAF stock, or of the proceeds when the company is sold (*see p. 22*). The government had asked for a court ruling that each stockholder who bought Interhandel stock since 1942 should give a "chain of title" by declaring who the previous owners had been—thus showing the "taint" of prior holders. As a result of the decision, Interhandel shares jumped from 1,210 francs to a peak of 1,435 on the Zurich stock exchange last week.

The ruling is not necessarily final, however. Lawyers for the Justice Dept.'s Office of Alien Property feel that it's unclear. There is a chance of an appeal, though no decision has yet been made. Since any challenge would first be made in Federal District Court, it will be some time before there could be a final ruling—perhaps from the Supreme Court.

The Interhandel corporation, meanwhile, has asked for more time to collect the Swiss banking records, which, if not produced by July 24, will lead to the dismissal of its case. A ruling on this plea is expected within two weeks.

Discount, incidentally, any change in the Administration's policies about alien property as a result of the visit to the U. S. by Chancellor Adenauer. Adenauer confined himself to urging Secretary of State Dulles to do what he could to get the present Administration bill—which allows return to individuals of up to $10,000—through Congress. Adenauer also saw Sen. Olin Johnston (D., S. C.), head of the Senate Judiciary subcommittee handling alien property, and Rep. Arthur G. Klein (D., N. Y.), who heads the comparable House group, urging action.

But the odds are heavily against any final action on the matter—Congress plans a July 15 adjournment.

•

But state and local decisions bulk as large as those from Washington. The week's highlights: action by authorities in Washington state, Chicago, Louisiana and Nevada.

Rayonier may be forced to close its sulfite pulp mill at Shelton, Wash., as a result of a ruling by the Washington State Pollution Control Commission to halt disposal of untreated waste material into Puget Sound. The action came when the commission refused the company a permit, required under a new state law, to continue present methods of liquor disposal. (Temporary permits were issued to 10 other sulfite pulpers until they come up with treatment plans—but permanent permits presumably will be refused unless the mills can promise to end pollution.)

The commission's refusal to grant Rayonier a permit grew out of oyster growers' complaints that their oyster beds are being destroyed. Rayonier denies that oyster deaths are due to sulfite liquor, but the commission feels it has "conclusive evidence" that the mill is "contributing too greatly" to pollution.

In Chicago, a proposed rezoning law threatens scores of paintmakers. Under the proposal, paint producers—and any other chemical companies that constantly have over 60 gal. of flammable liquids on their premises—would be allowed to operate in only one of three proposed manufacturing zone classifications—that for heavy industry; currently, such firms can operate in either of the two now-existing types of zones. Adding to the worries: there are only three small patches of land that would be zoned for heavy industry in all of Chicago outside the Lake Calumet area in the southeast corner of the city.

In Louisiana, however, an industry move gained support. A proposed 1½¢ rise in the gas gathering tax was defeated in what was the bitterest, most riotous session of the state's House of Representatives since the days of Huey Long.

But still to come up for a vote is the measure sponsored by Gov. Earl Long that would raise the sulfur mining tax from $1.03 to $3. Freeport Sulphur, which is fighting the proposal, has offered to open its books to any nationally known accounting firm of good standing named by Long to disprove Long's charge that Freeport has paid off legislators to get them to oppose his bill.

Nevada, meanwhile, is planning a new industrial development area. It's asking the federal government to transfer to it about 125,000 acres of land in the Eldorado Valley south of Boulder City. Companies could get power from Hoover Dam, water from Lake Mead, and natural gas from two large pipelines that run through the area.

•

Private site purchases are also in the news in Ohio. Du Pont has taken up an option on 67 acres near Washington Court House for construction of a paint factory. And Olin Mathieson is reportedly the company that has optioned a 700-acre tract near Letart Falls, some 85 miles downriver from the site of its abuilding alumina and aluminum plants.

Union Carbide, however, is building in Puerto Rico. It will erect a $28.5-million ethylene glycol plant at Ponce, adjacent to the Commonwealth Oil refinery there.

And W. R. Grace may build there, too. It is now exploring possibilities of producing paper products and wallboard from bagasse, reportedly using a new chemical process.

•

Public sale of stock in Union Chemical and Materials Corp. held by the Clint Murchison interests is now uncertain. The Murchison group had planned to sell about half of its stock, and had gone so far as to file a registration certificate with the Securities & Exchange Commission. But there's now been a decision to hold up on the actual sale.

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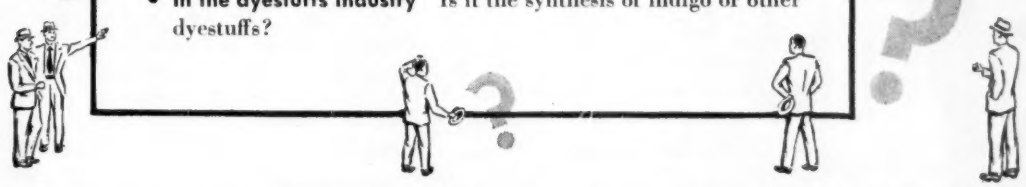
- **In the glass industry** Is it temperature control of glass molds?
- **In the metallurgical industry** Is it alloy modification? Is it titanium manufacture? Is it desulfurization?
- **In the petroleum industry** Is it stability improvement? Is it petro-chemicals manufacture?
- **In the plastics industry** Is it monomer manufacture? Is it polymerization catalysis?
- **In the pharmaceutical industry** Is it a synthesis where you can use sodium alcoholates?
- **In the rubber industry** Is it butadiene polymerization?
- **In the textile industry** Is it the synthesis of raw materials for synthetic fibers?
- **In the detergent industry** Is it the manufacture of fatty alcohols?
- **In the dyestuffs industry** Is it the synthesis of indigo or other dyestuffs?



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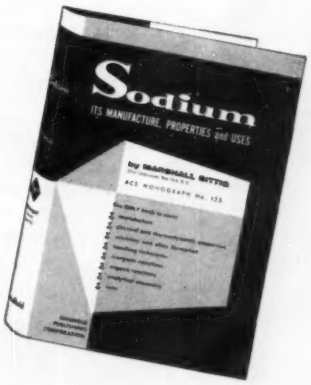

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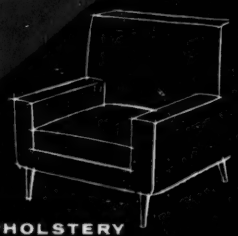

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OPINION

New Editor Takes Over

Starting with this issue, the masthead of CHEMICAL WEEK once again will have a line for "Editor." He is Howard C. E. Johnson, who steps up from Executive Editor, a position he has held since Jan. 1 of this year. A Ph.D. chemist (University of Wisconsin)—B.A., University of Illinois—and former Rohm & Haas researcher, he joined *Chemical Industries* in 1944, rising to managing editor three years later. He played a key role in rejuvenating *Chemical Industries* and, after its purchase by McGraw-Hill in 1951, in recasting that magazine into CHEMICAL WEEK. His leadership—based on twelve years of editorial experience—assures the continuing leadership of CHEMICAL WEEK as the business paper of chemical management men.

WALLACE F. TRAENDLY, **Publisher**
SIDNEY D. KIRKPATRICK, **Editorial Director**

Detroit 'Milk Route'

TO THE EDITOR: We were most interested in the article ['Milk-Route' Delivery] (*June 9*).

Our company has been established in tank-truck bulk delivery of acid in Detroit and surrounding area for approximately seven years. We originally began with the delivery of muriatic acid and have progressed to the point where we also handle sulfuric, phosphoric and nitric acids.

In many instances, we service the customer's requirements through the installation of a storage tank on their premises, which we fill at regular intervals. Others of our customers prefer that we pump from our truck directly into their working tanks at times so requested by them. This depends largely on their particular type of application and the quantity of acid used.

Storage tanks located on our railroad siding property in the capacity of 10,000 gallons each for sulphuric, phosphoric and nitric acids and 20,000 gallons for muriatic assure us of an adequate supply of acid at all times. This, plus the fact that we have our own 3,800-gal. tractor-trailer for handling muriatic acid from our sources of supply, places us in a position whereby we can "weather" any rail or transportation problems that might result in an inventory inadequacy.

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Detroit, Mich.

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Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 W. 42nd St., New York 36, N.Y.

CW at the MCA

TO THE EDITOR: . . . Your coverage of MCA's annual meeting at The Greenbrier is excellent. The pictures are very good and together with the written part indicate very well what went on at the meeting. It is a very interesting and readable account, and I commend you for it. . . .

GEN. JOHN E. HULL
President
Manufacturing Chemists' Assn., Inc.
Washington, D.C.

OPINION

TO THE EDITOR: . . . A very prompt report of the MCA meeting at White Sulfur Springs.

R. L. MURRAY
Chairman of the Board
Hooker Electrochemical Co.
Niagara Falls, N.Y.

TO THE EDITOR: . . . My congratulations on such a speedy and fine report.

FRED C. FOY
President
Koppers Company, Inc.
Pittsburgh, Pa.

TO THE EDITOR: . . . I thought the coverage of the MCA meeting was well done and quite a compliment to the caliber of the meeting. . . .

JOHN L. GILLIS
Vice-President
Monsanto Chemical Co.
St. Louis, Mo.

TO THE EDITOR: . . . I greatly enjoyed your coverage of the annual meeting of the Manufacturing Chemists' Assn. at White Sulphur.

CHARLES S. MUNSON
Chairman of the Board
Air Reduction Co. Inc.
New York

TO THE EDITOR: . . . I enjoyed looking over your presentation of the MCA meeting. Your photographer must indeed have been a skillful one as I was certainly not aware that the pictures in which I was included were being taken.

C. H. GREENEWALT
President
E. I. du Pont de Nemours & Co.
Wilmington, Del.

TO THE EDITOR: . . . The June 16 issue of "Chemical Week" . . . was greatly appreciated.

K. C. TOWE
President
American Cyanamid Co.
New York

By Any Other Name

TO THE EDITOR: This is to compliment you on the article entitled "Patent Tips for Laymen" (*CW, June 15, p. 38*), dealing with our lecture series at the University of Montreal.

This article is timely in showing the interest in this subject.

To avoid any misrepresentation, we

Me–and my phthalic anhydride

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OPINION

would like to draw your attention to the terminology "lawyers" which is used to identify Mr. Swabey and me.

Actually, the designated description for those practising before the Patent Office is either "patent attorneys" or "patent agents."

We trust you will not mind our having brought this to your attention.

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Alan Swabey & Co.
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SEE YOU THERE

International Conference on Nuclear Reactions, Amsterdam, Netherlands, July 1-7.

Symposium on Chemical Additives in Foods, 2nd of 5 symposiums, Amsterdam, Netherlands, July 9-11.

Society of the Chemical Industry, 75th annual meeting, London, July 9-14.

Symposium on Synthetic Polymer Chemistry, Notre Dame, Ind., July 16-17.

Ninth Oak Ridge Regional Symposium, Virginia Polytechnic Institute, Blacksburg, Va., July 30-31.

National Soybean Processors Assn. and American Soybean Assn., annual meeting, University of Illinois, Urbana, Aug. 13-15.

National Agricultural Chemicals Assn., 23rd annual meeting, The Essex and Sussex, Spring Lake, N.J., Sept. 5-7.

American Institute of Chemical Engineers, William Penn Hotel, Pittsburgh, Sept. 9-12.

International Congress on Catalysis, Bellevue-Stratford Hotel, Philadelphia, Sept. 10-14.

Packaging Machinery & Materials Exposition, semi-annual meeting, Public Auditorium, Cleveland, Sept. 11-14.

Federal Wholesale Drug Assn., meeting, The Greenbrier, White Sulphur Springs, W. Va., Sept. 16-19.

Instrument Society of America, 11th national meeting, Coliseum, New York, Sept. 17-21.

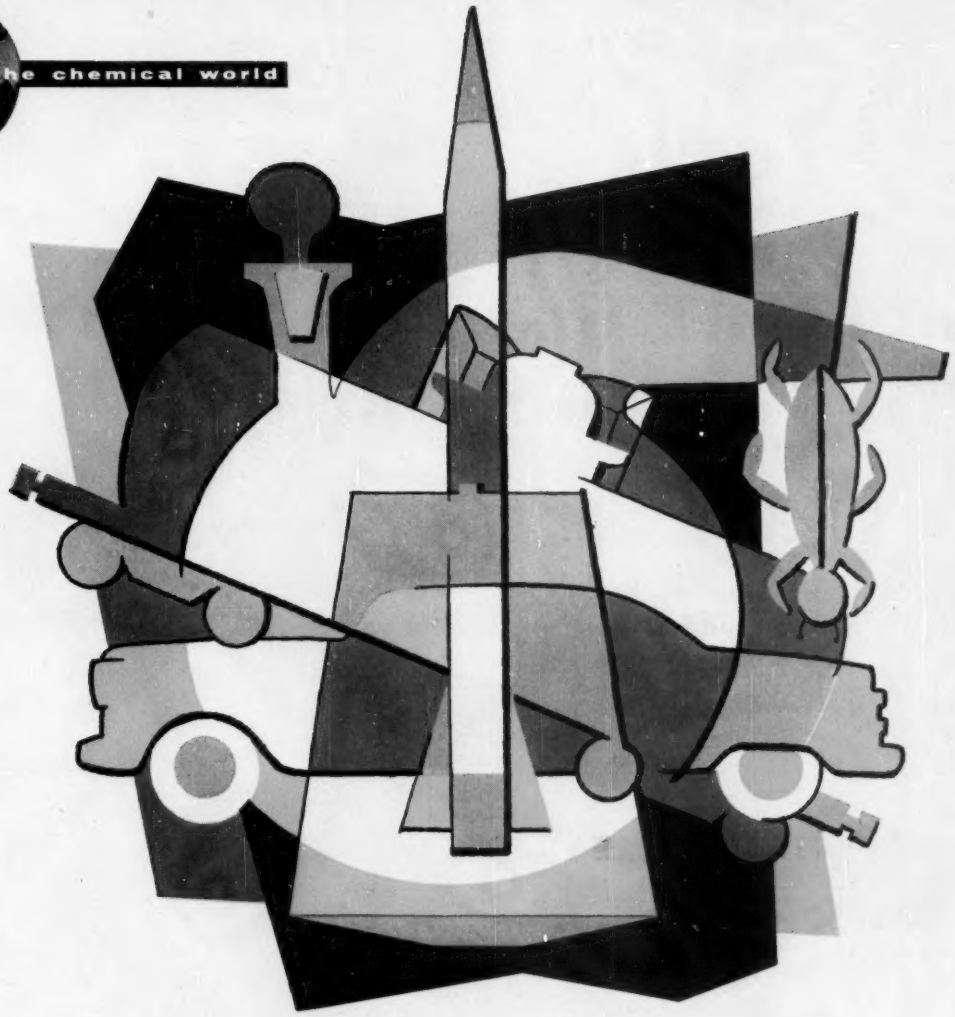
Materials Handling Institute, fall meeting, The Greenbrier, White Sulphur Springs, W. Va., Sept. 24-26.

American Oil Chemists' Society, 30th fall meeting, Chicago, Sept. 24-26.

American Institute of Mining & Metallurgical Engineers, Rocky Mountain mineral conference, Newhouse Hotel, Salt Lake City, Sept. 26-28.

Drug, Chemical and Allied Trades Section, New York Board of Trade, annual meeting, Pocono Manor, Pa., Sept. 27-30.

FMC in the chemical world



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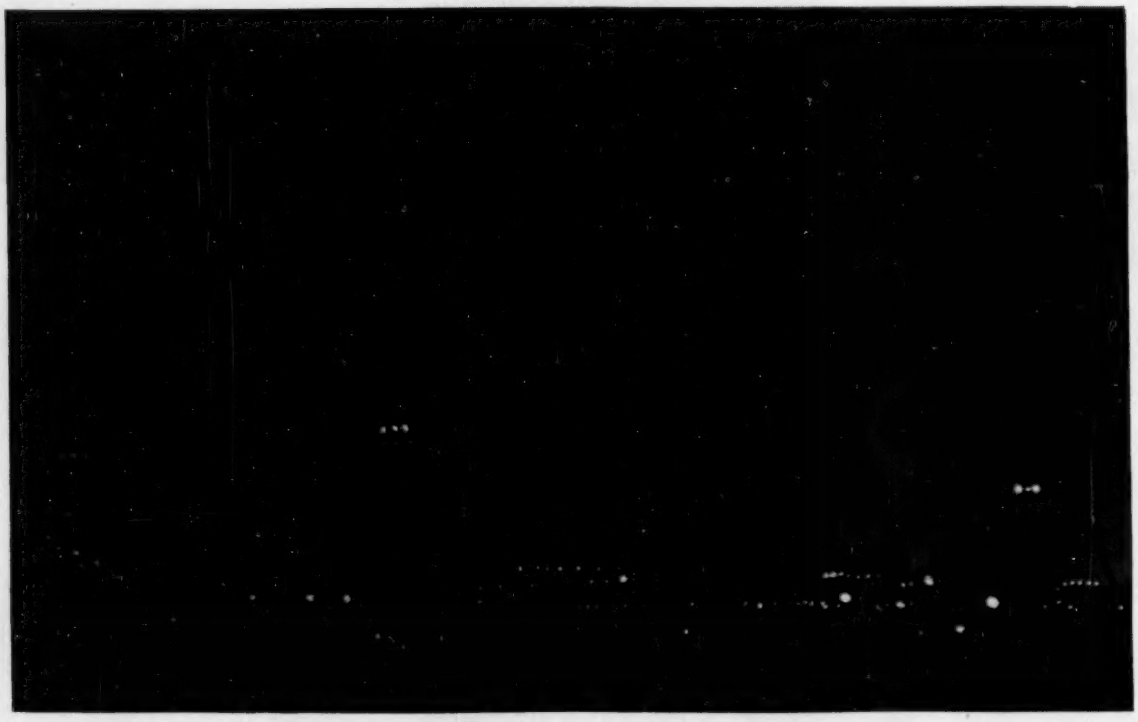
Chemical Week

June 30, 1956



LOUISVILLE PLANT AT NIGHT: For supplying synthetic rubber makers, this plant may be obsolete.

Industry Does What Government

The government's stake in the day-to-day activities of a major customer of the chemical industry becomes a hot issue this week.

Since the House of Representatives last Tuesday disapproved sale of the Louisville, Ky., butadiene-from-alcohol plant *(above)*, and started the ball rolling for another try at selling the plant *(see box, above right)*, industry is debating these two possibilities:

- Whether the government is finally about to wash its hands of the synthetic rubber business, or,
- Whether Congress may continue to supervise or investigate the industry.

You get both answers when you talk to industry men in Akron, in New York or in Texas. But there's one point on which there is no disagreement: if the industry keeps up the record it has so far, there's no reason whatever for any continued government supervision. The chance of some sort of government supervision is, of course, greater on synthetic rubber manufacture than for most other industries because of the government's part in financing the construction of the plants, and because the prices companies paid for the plants in 1946 and in 1954 were often below the total cost of the plants to the government.

Too, since final disposal was carried out under a Republican administration, there's always the chance that the Democrats may charge that it is "a giveaway to big business."

But most of the arguments are negated by the industry's performance. In fact, you can list eight different ways that industry, in taking over synthetic rubber production from the government's Federal Facilities Commission, has done a better job:

- No longer do users have to order their rubber 90 days ahead of time to get it without paying a penalty.
- Companies are expanding their production ahead of demands for their product. If the government were still in business, demand would undoubtedly be greater than supply.
- Last fall, when demand was high, companies ran their plants at a rate considerably above rated capacity—something the government had been reluctant to do in the past.
- Companies have cultivated the export market, which, to the government, was merely a place for the rubber U. S. customers didn't buy.

Death and Birth

Congress, by a voice vote, last Tuesday killed a prospective sale of the Louisville alcohol butadiene plant. But almost without drawing a breath, it has started planning a new selling effort.

On Thursday, the House Armed Services Committee voted to extend the life of the Rubber Disposal Commission, and to renew its authority to sign a long-term lease.

But unless an exceptional lease offer is made soon, it may not be taken up. The committee asked the disposal group to report early next year on a new disposal law that would allow conversion of the plant to other chemicals—most likely with no obligation for reversion to making butadiene in wartime.

This would be a sharp change from the previous law, which required from the high bidder—Union Carbide—a promise to produce butadiene at Louisville—a promise it failed to make.

Couldn't Do

• Where the government could run its entire plant complex on an integrated basis under which some plants were geared to turn out only a few types of rubber, companies have installed new equipment to enable their plants to produce a wide range of rubbers. In this way, there is a considerable competition on the more specialized products.

• Companies have made improvements within grades. Goodyear, for example, recently introduced its type 1773, which it feels may supplant the government's GR-S 1703 for many of its uses—as well as broaden the market for its general class. Texas-U.S. Chemical, jointly owned by U.S. Rubber and Texaco, has done the same thing to the standard GR-S 1500 with its type 1551.

• Companies have done substantial product development work on the interchangeability of rubber grades, where the government usually prepared and circulated rather elementary directions for use of a specific rubber grade.

• But probably the most intriguing private industry activity is in developing even newer types of rubber, both the variations on current butadiene-styrene polymers, and the development of newer polymers with substantially different properties.

Much of the recent work on new polymers has so far been directed at the duplication of natural rubber—a *cis*-poly-1,4-isoprene. And at least one company, Goodrich-Gulf, now feels that such a rubber could be competitive with natural rubber at little more than 30¢/lb., assuming, of course, that the price of isoprene, when made on a large scale, would be somewhere in the 20-30¢ range. And one Goodrich-Gulf man feels that an 18¢ figure for isoprene (contrasted with 14¢ for butadiene) is not out of the realm of possibility.

Similar research has also been carried on by all the other companies connected with the "Big Four" rubber fabricators, though U.S. Rubber has said nothing publicly.

Greener Pasture? But to some who are actively involved in rubber research, the search for a duplicate of natural rubber seems a blind alley. Why, they ask, must one try to duplicate a material that, if grown efficiently, can be sold for 12-15¢/lb.? They admit there is the chance that supplies from the Far East might be cut off in time of war, but feel that this incentive is not great enough.

Instead, they see the possibility of bigger markets and profits from other elastomeric polymers, and cite Phillips Petroleum's work with straight polymerization of butadiene. The olefin polymerization systems developed by such men and groups as Ziegler, Natta, Phillips and Standard Oil (Ind.), they feel, may ultimately lead to polymers that will have substantial advantages over either the currently known GR-S, butyl or the synthetic polyisoprene—and be a market worth cultivating.

SHELL'S PLANT AT TORRANCE: Trend is toward integrated plants.

PHOTOS—CAMERAMEN, INC.

THEY LISTENED and watched, as Office of Alien Property sold its remaining Rohm & Haas stock, and received . . .

The Biggest Price Ever for Alien Property

The government, in selling last week its remaining 8% interest in the Rohm & Haas Co., got the largest single payment it has ever received in a sale of seized enemy property.

And paradoxically, though the sum —$34,405,649.61—paid by a group of 84 underwriters headed by Kidder, Peabody & Co. and Drexel & Co., was the largest such dollar amount, it went for the smallest of the three blocks of R & H stock the government held, Some 11% of the stock was released recently in settling a court case (*CW, June 9, p. 19*), and another 17% was sold in 1949 to the public through an underwriting group.

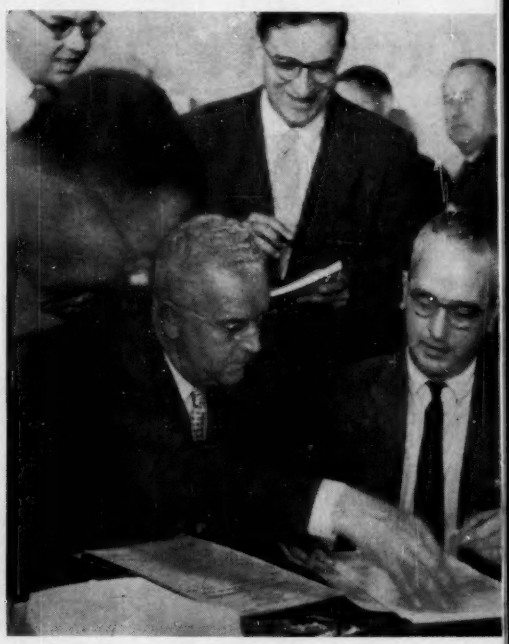
The total price then was $9.2 million—the equivalent of $98.59 per preferred share and $38.54 for each common one. The underwriters paid $428.2512 per common share this time, and began selling them to the public last Thursday at $440.

But this alien asset sale will be small compared with a future one. The government, perhaps as soon as this fall, may be able to sell its holdings in General Aniline & Film—worth well over $100 million.

OPENING the bids, William Downey (left center) readies them for . . .

READING by Lewis Rubin, chief of OAP's liquidation section.

SPECTATORS crowd up to confirm details from Downey (right) and Joseph L. Dwyer.



Texas Strike Ends—But Poser Remains

This week, construction workers on projects at some 20 chemical, rubber and petroleum plants in Texas's Sabine River area are back at work following a 12-week walkout that, even for an area that has known some long strikes, was still a record.

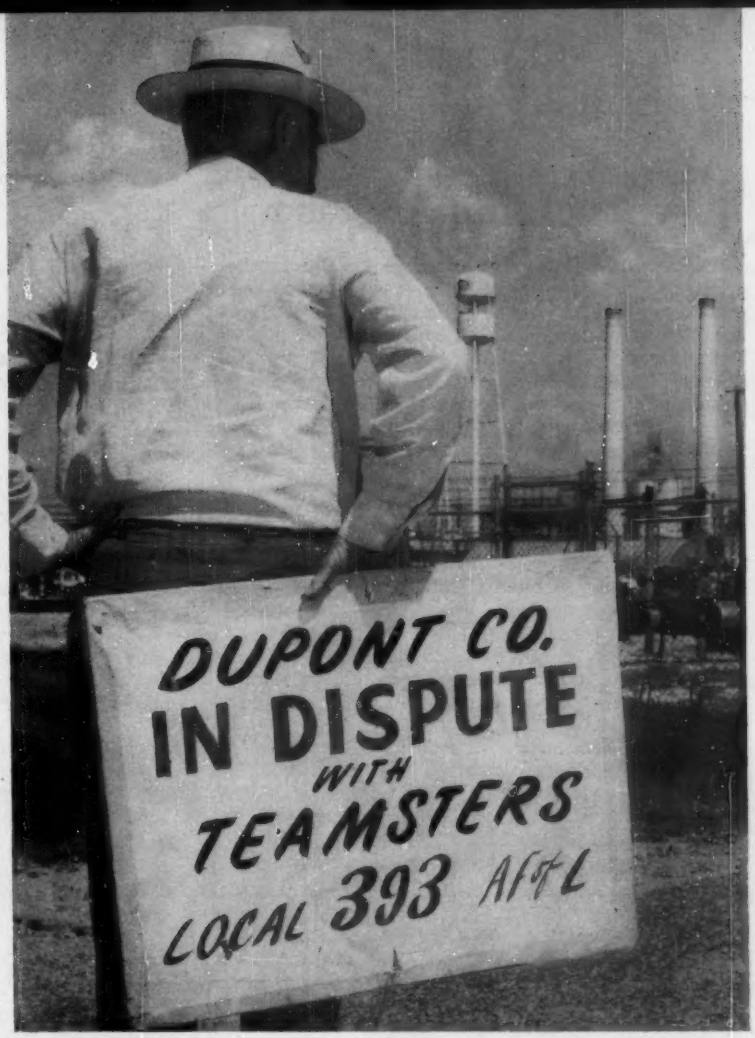
Involved: some 4,000 workers—for 14 industrial contractors—who were members of 30 different craft unions. For many, the settlement was a 32½¢/hour wage boost spread over the next two years.

But the cost of the strike will be more than that of these wages. Equipment stood idle; plant startups were delayed; some companies that were looking at the area as a site for new plants decided to go elsewhere.

'One-Shot' Bargaining? But the real point that the strike may have emphasized is that construction harmony in the Sabine area can hardly come unless all unions join in negotiating a single contract. And though this wasn't true with the current strike settlement, some area labor officials feel that when contracts next come up for negotiation, a central bargaining group may handle them all. One possible signpost: Where contracts in the area have previously expired at different times, all will now end on March 31 of any year.

There have been two main areas of disagreement. Some craft groups have felt the wages paid them weren't equal to those paid to others with similar skills. Too, the leadership of the pipefitters and operating engineers unions has, up to now, consistently refused to join in central bargaining. (And management, in turn, has refused to deal with a committee that doesn't represent all crafts.)

But this may be changed. As George Cook, a vice-president of the Texas State Federation of Labor, put it: "I agree wholeheartedly that the 'one-shot' bargaining arrangement will come nearer than anything else to solving the construction labor problem in this area.



DU PONT WORKER*: He's one of 4,000 who are back at work this week.

"I believe that the pipefitters and operating engineers will come in on the plan next year."

Back to Work: In any case, most construction affected by the strike was scheduled to be going again by June 25. Catalytic Construction, anticipating settlement, actually started preliminary work June 20 on the Firestone butadiene plant near Orange. Catalytic located heavy machinery and started stockpiling needed material in preparation for a "crash" construction program. It still hopes to meet its contract date for completion of the plant in early '57.

Du Pont's construction division will now be able to go ahead with expansion plans for its chlorosulfonated polyethylene plant in Jefferson County and boosts in production of nylon intermediates, methanol, adipic acid and polyethylene at its chemical complex in Orange County.

Other projects slated to get under way this week are expansions of oil refineries belonging to Gulf, Texas, Atlantic Refining, Pure Oil and Magnolia Refining—all in Jefferson County.

The Bigger Picture: A substantial by-product of the settlement is that it gives a breathing spell during which it may be possible to solve the inter-union squabbles, perhaps through central bargaining, perhaps in some other manner.

The importance of good labor relations to companies thinking of building in the region was emphasized by Bob Dear, director of Orange's industrial development committee, who happily goes out on a limb in his estimate that the next 10 years should see at least $1 billion worth of process industry construction in the area.

*He declined to have his face shown in picture, fearing "retaliation."

Washington Angles »

» **Defense essentiality hearings** on fluorspar—originally scheduled for this week—have been put off to Sept. 10 to give domestic producers more time to collect data. The industry has petitioned for tariff relief on grounds that it's necessary to national defense and is being damaged by imports. An industry previously could ask the Tariff Commission to consider this angle, but the new trade agreements law sets up a procedure to get a hearing by the Office of Defense Mobilization on this basis alone.

» **A requirement that halting of industrial** operations by the military get Congressional okay has been knocked out of the Defense Dept. money bill by a Senate committee. The House has already killed the provision.

Up to now, Congress has blocked Pentagon efforts to shut down six such projects, including Navy paintmaking shops at Norfolk, Va., and Mare Island, Calif. (CW, June 9, p. 27).

But the Senate Appropriations Committee, in killing the provision, directed the Pentagon "to maintain all such facilities . . . unless such disposal or transfer is economically justified, and unless no increased costs result."

» **New rules for controlling barbiturate** and amphetamine manufacture and sale won't be passed by Congress this year.

More hearings, too, must come on the food additives bill before passage. They've been put off for months by the illness of Rep. Joseph O'Hara (R., Minn.), co-sponsor of an industry bill.

» **Should Congress investigate explosions,** other accidents from misuse of compressed gas cylinders? Yes, says Rep. J. Harry McGregor (R., Ohio), who for months has been talking of forcing mandatory labelling on the industry. He now says he may ask for study of the safety problem by the House Commerce Committee, let the committee decide if and what new rules are needed.

» **The customs simplification bill** may be enacted this year, after all. The House has already okayed a bill setting export value of imported goods as the uniform base for calculating duty. That would end the foreign value method—which yields a higher base for industrial chemicals, soaps, paints and some other items.

Now the Senate Finance Committee has opened hearings on a State Dept. compromise giving producers of these items three years to adjust to the new export value method. The House will agree to this mild concession if—as expected—it clears the Senate.

EXPANSION

Manganese Sulfate: Duncan, Dieckman & Duncan Mining Co. will add a leaching plant to its present producing complex near Mena, Ark., to make manganese sulfate and manganese oxide.

•

Pulp and Paper: Mississippi Pulp and Paper Co. is planning to build a $30-million kraft paper plant near Columbus, Miss. Present production target is 500 tons/day. Construction will start as soon as present engineering work is completed.

•

Uranium: Canada's government-owned Eldorado Mining and Refining Co. will construct a $200,000 pilot plant to probe different methods of producing uranium metal. Eldorado President William J. Bennett told a House of Commons committee last week that a producing plant with a capacity to meet Canada's present and future uranium needs will also be built and is expected to be in operation by late '57.

•

Rockets: Aerojet-General, subsidiary of General Tire and Rubber, plans to build a $13-million liquid-propellent rocket engine plant in Sacramento, Calif.

•

Detergent Alkylate: Shell Oil Co. of Canada will build a $3-million plant at Montreal East, Que., to produce dodecyl benzene, as well as components for high-octane gasoline. Construction will begin soon; production is slated to start in mid-'57.

COMPANIES

Cary Chemicals Inc., Milltown, N.J., plans to offer 230,000 shares of common stock and $2.3 million worth of 6% first-lien bonds due in 1976.

•

American-Marietta Co. directors have just authorized a 5-for-4 split of all outstanding shares. Shareholders will receive one additional share for each outstanding four shares held of record on June 29, 1956.

•

Union Bag & Paper stockholders will vote on a proposed merger with Camp Mfg. at a special meeting on July 12. Camp shareholders, who will also vote on the proposal at a special meeting, would receive 1.75 shares of the new company—to be called Union Bag-Camp Paper Corp.—for each share of Camp common and Camp common B held. If the merger is approved, application will be made to list Union Bag-Camp Paper shares on the New York Stock Exchange.

FOREIGN

Rayon/Israel: A group of American industrialists and financiers will build a $20-million rayon yarn and tow plant in Israel. The group is headed by Israel Rogosin, president and chairman of Beaunit Mills Inc.

•

Fertilizer/Greece: The Greek government will accept bids on construction of a $25-million factory to produce nitrate fertilizer in Ptolomais.

•

Trade/China-Italy: A group of Italian businessmen have signed trade agreements with the Chinese government. The contracts, calling for $14 million worth of trade in each direction between the two countries, stipulate that China will supply Italy with silk, egg powder and soya oil in exchange for Italian fertilizers, rayon and other chemical products.

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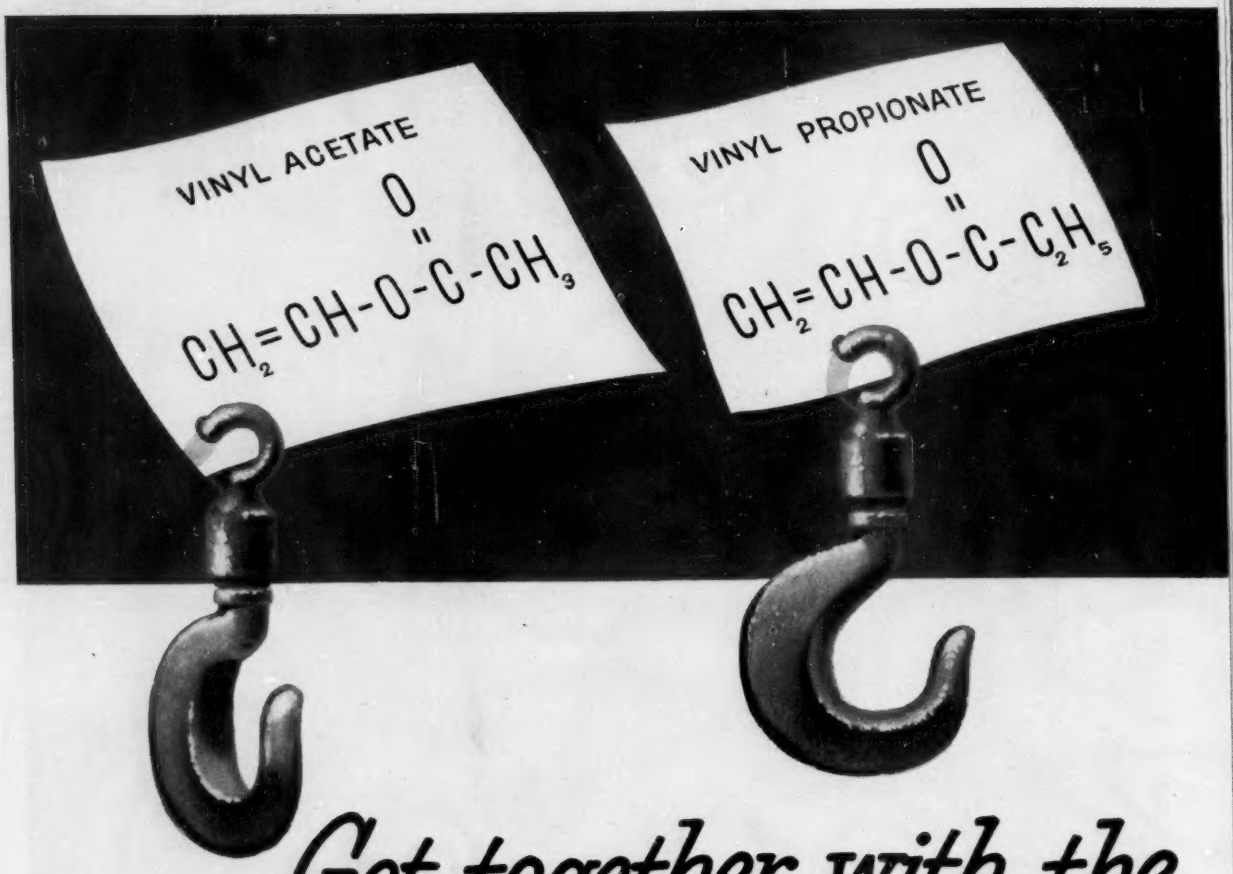

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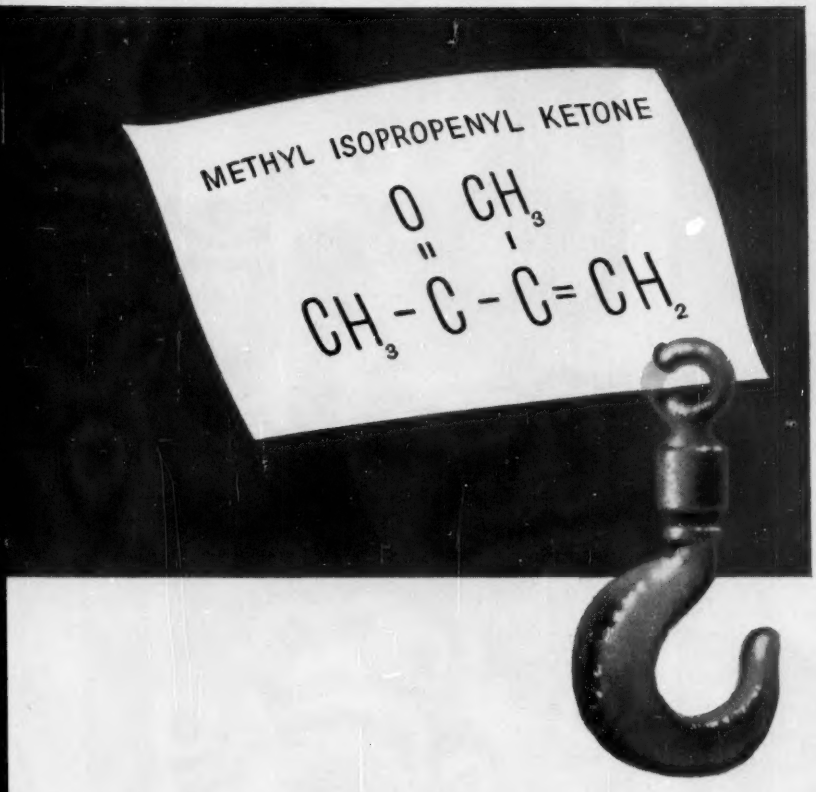
Distillation Range @ 760 mm, °C	71.8-73.0	within 6° spread including 94.9	98
Color APHA, max.		30	water-white
Water, % wt., max.	0.15	0.25	
Specific Gravity @ 20°/20°C	0.9330-0.9340	0.9160-0.9185	0.854
Acidity as acetic acid, % wt., max.	0.02	0.1	



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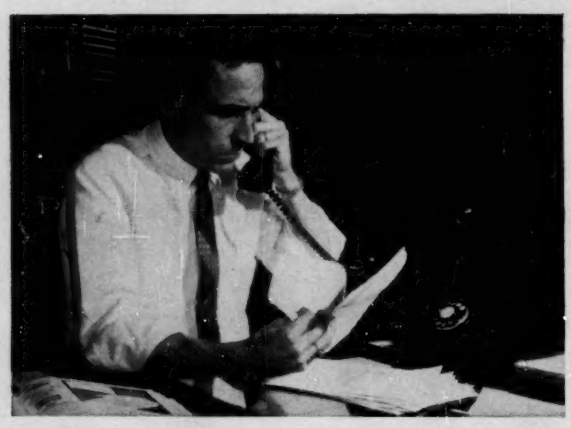
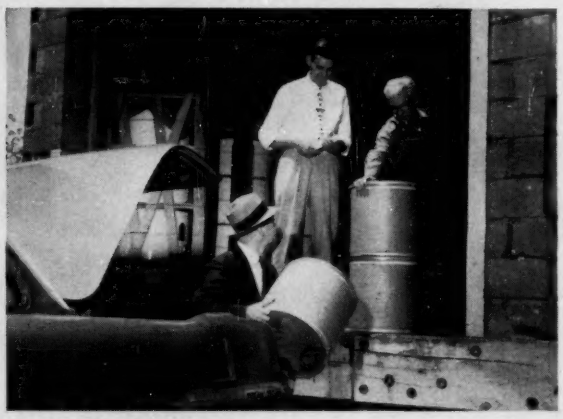


CUSTOMER IN COLUMBUS needs a special proprietary chemical *immediately*. Manufacturer of the chemical has none on hand — nearest stock point is 350 miles away. Situation desperate, can Merchants do something?

MERCHANTS' MAN IN CINCINNATI calls the manufacturer, locates several drums of the chemical at the plant of a nearby soap company. They agree to lend three drums to meet the emergency. Merchants' truck makes the pickup.

AT MERCHANTS' WAREHOUSE, the drums are loaded into the car of "Dutch" Spatta, manager of Merchants' Cincinnati office. Regular delivery by truck will take too long.



A FAST 108 MILES LATER "Dutch" delivers the drums in time to keep production going. It was somebody else's product and somebody else's problem, but Merchants again lived up to its reputation for helping a customer out of a jam.

WHY MERCHANTS' CINCINNATI MANAGER DROVE 108 MILES TO DELIVER SOMEBODY ELSE'S PRODUCT —

At Merchants, service goes beyond the mere filling of orders for industrial chemicals. Each office of Merchants' nationwide chain makes a point of becoming familiar with its customers' problems. In the past 35 years Merchants has frequently "walked the extra mile" to help a production man out of a tight spot. Among the products offered are acids, alkalis, fungicides, surfactants, chlorinated solvents, emulsifiers, laundry compounds, soaps, dry ice and chemical specialties.

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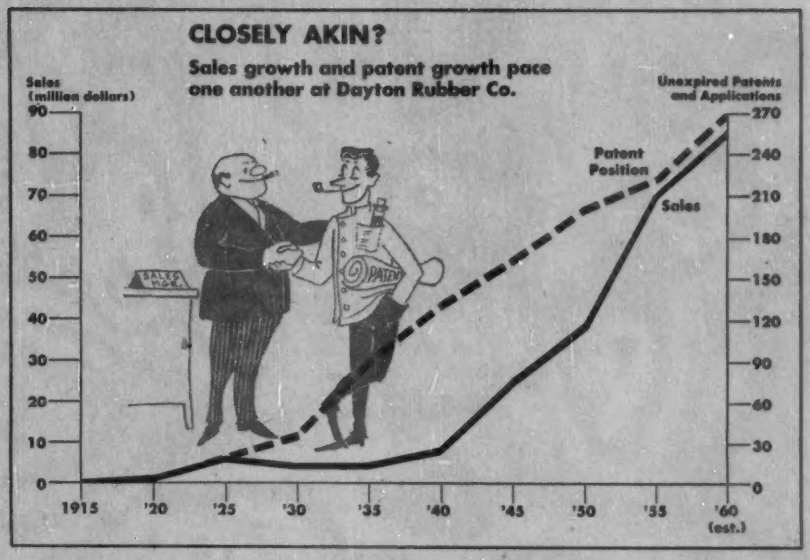
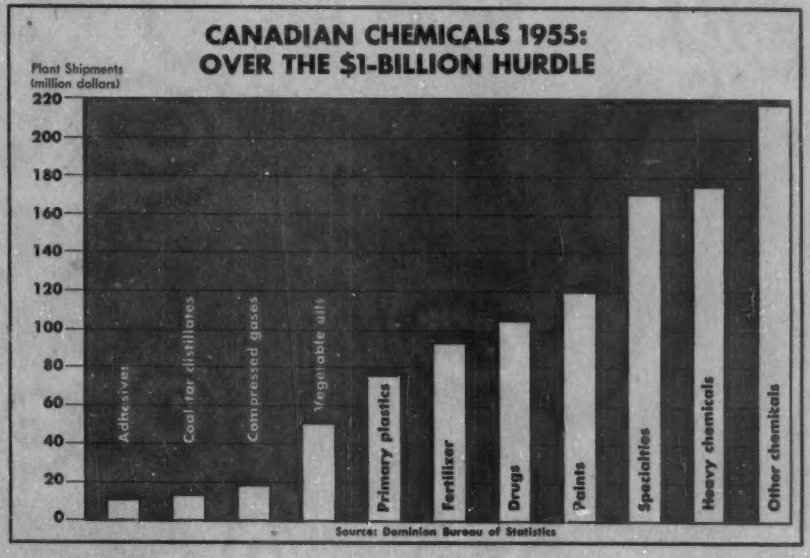
Charting Business

CHEMICAL WEEK
June 30, 1956



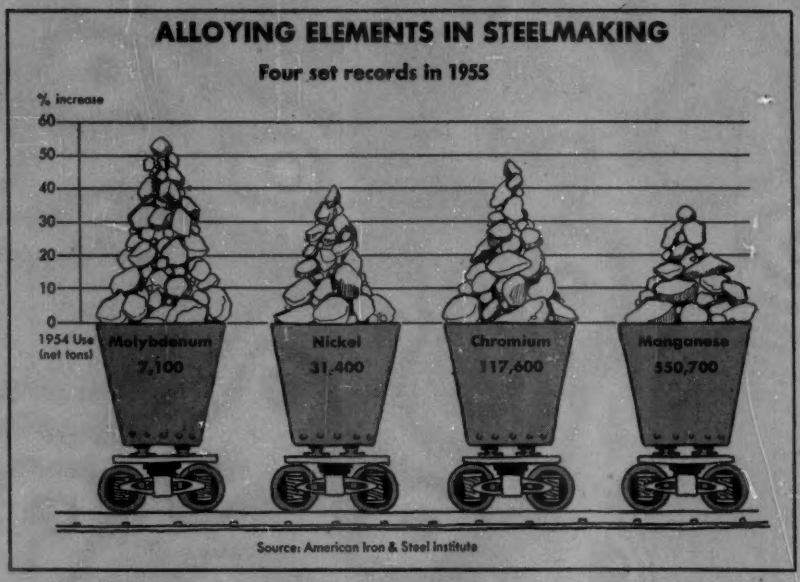
IF A PATENT is valuable, it should eventually reflect its worth by helping to fill the patenting company's coffers. Over the years, therefore, a dynamic patent position should foster dynamic growth. Such a relationship—albeit one that's difficult to assess mathematically—is what Dayton Rubber Co. suggests in this graphical presentation of its own patent and sales history. For the future: two significant patent bills of vital concern to chemical producers are now awaiting Senate hearings *(CW, June 16, p. 66)*.



BY GINGERLY rising 12% in 1955 over the 1954 reported value, Canadian chemical shipments topped the $1-billion mark by $50 million worth. That's a new high for burgeoning Canadian chemical plants. Only two selected industries—adhesives and vegetable oils—suffered declines (16.3% and 4.4%, respectively) in the period. Supplementing the $1.05-billion total, U.S. chemical producers supplied 85.4% of $260.5 million worth of Canada's imported chemicals. Canadian sales to us: 53.2% of $210 million in chemical exports.

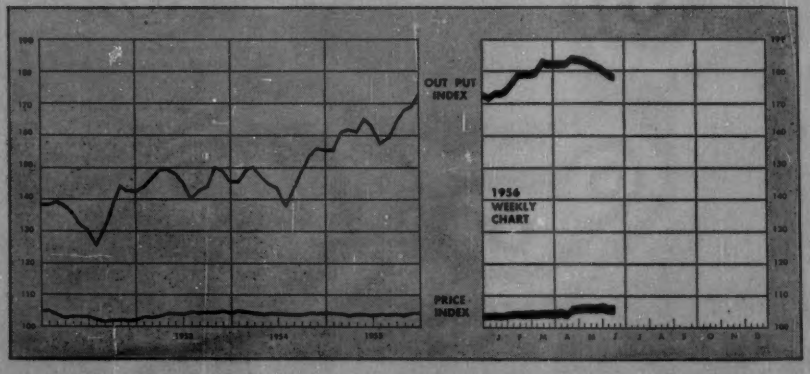
Charting Business

(Continued)



CHEMICAL industry's link to steelmaking is strongly forged. Reason: today chemical firms are among the leading producers of metal-chemical elements (like boron, columbium, tantalum, manganese, titanium, molybdenum, and zirconium)—materials vital to ferro-alloy production. Last year, four alloying elements, molybdenum, nickel, chromium, and manganese, set new consumption records. Tungsten usage was up 90.4% in 1955 over 1954, but set no new mark. Vanadium and titanium scored gains of 67.0% and 35.4%, respectively.

BUSINESS INDICATORS



WEEKLY	Latest Week	Preceding Week	Year Ago
Chemical Week Output Index (1947-49=100)	177.2	178.3	162.9
Chemical Week Wholesale Price Index (1947=100)	105.4	105.5	104.1
Stock Price Index of 11 Chemical Companies Standard & Poor's Corp.)	472.0	467.5	445.3

MONTHLY Trade (million dollars)	Manufacturers' Sales			Manufacturers' Inventories		
	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
All manufacturing	27,266	27,095	26,025	47,927	47,433	43,264
Chemicals and allied products	1,978	1,939	1,912	3,409	3,361	2,943
Petroleum and coal products	2,512	2,567	2,284	2,811	2,785	2,658

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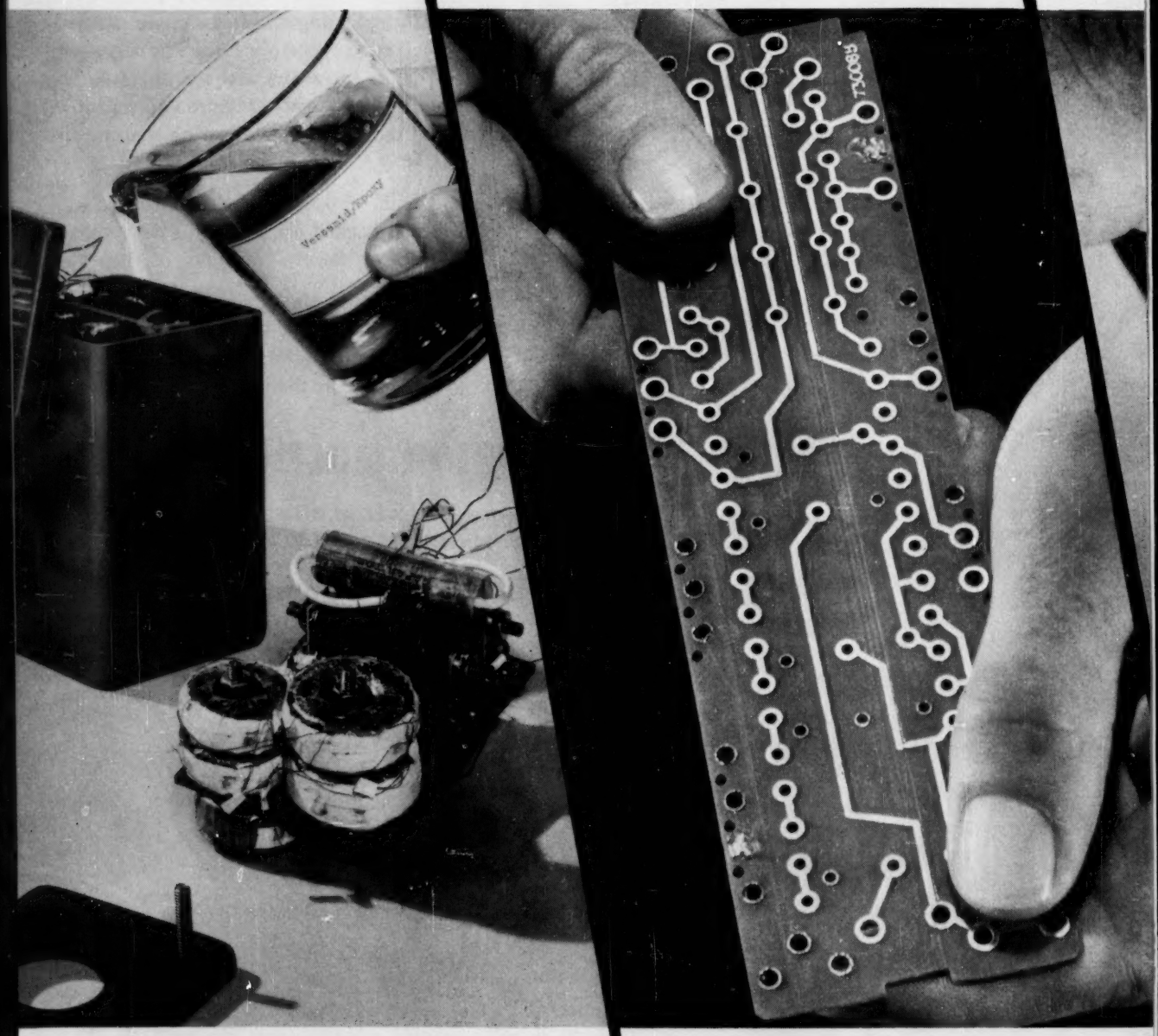
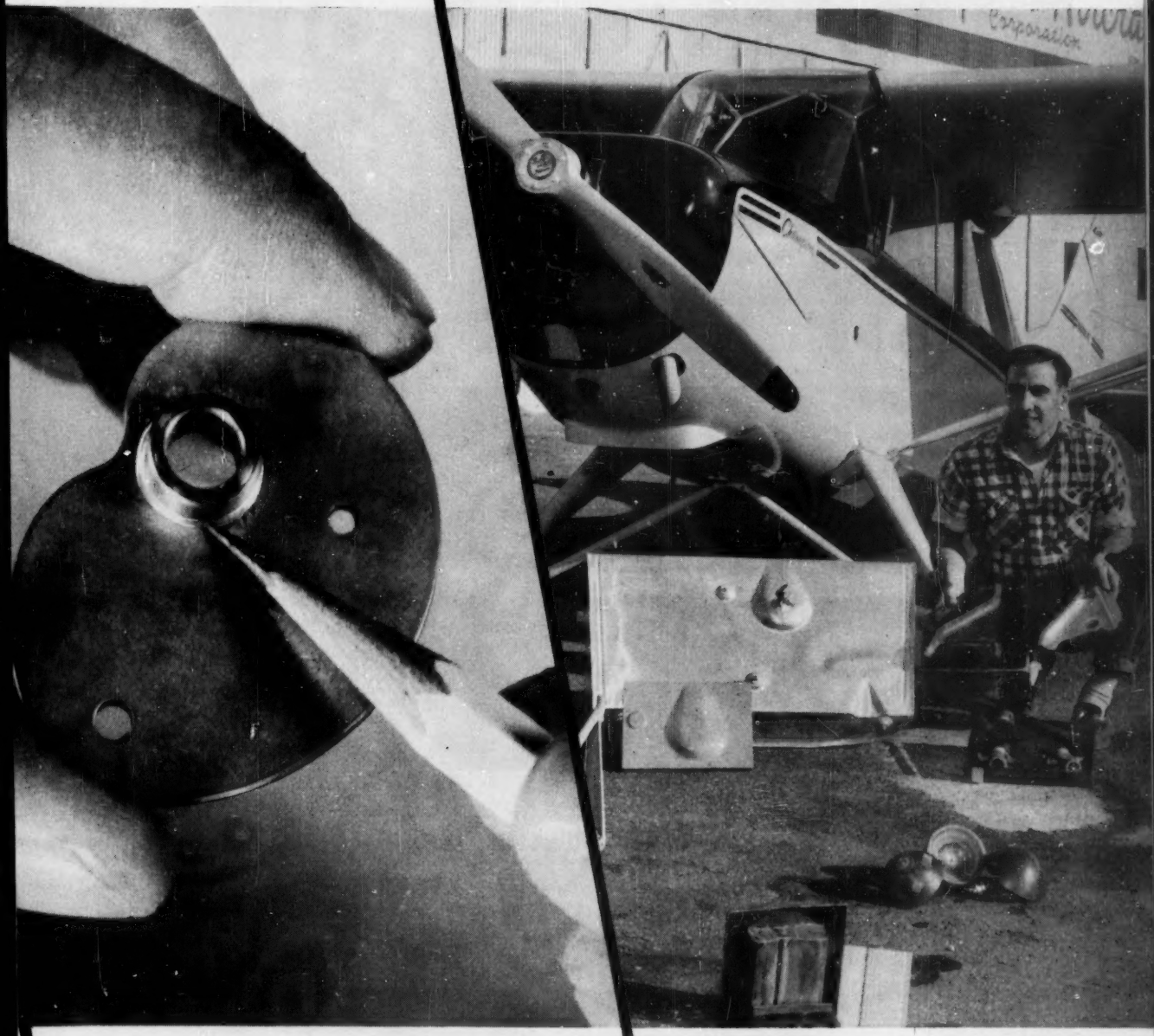


For encapsulation and embedment, thermosetting alloys of *Versamid* 125 and epoxy resins offer: high physical and dielectric strength; fast curing without toxic or volatile curing agents; low shrinkage on cure; lasting toughness; resistance to water, chemicals, most solvents. For complete data, write for Technical Bulletin 11-E.

Printed circuit bases like this are a new use for *Versamid* 125-epoxy resin blends. Toughness, adhesion and resistance to corrosion make them ideal for this purpose. Another blend (*Versamid* 115 and epoxy) bonds electrolytic metals to the bases, with low pressure. Formulations appear in Technical Bulletins 11-E and 11-F.

CHEMICAL DIVISION OF

four ideas can improve your product?



Super-strong adhesives of Versamid-epoxy alloy bond almost any substance to any other . . . permanently. Adhesive bonding replaced soldering in making the cam shown above, saving 47¢ per cam and improving the product. *Versamid*-based adhesives are outstanding for wood, steel, brass, aluminum, glass and plastics. Write for Technical Bulletin 11-F-1.

Plastic tools and dies like these are used daily in aircraft (above), automotive, other industries. Dies of *Versamid* 125 and epoxy resins are producing aluminum and steel stampings. Such dies have great impact strength, can be made to wide range of specifications. Spring issue of *Progress Thru Research* has more facts.

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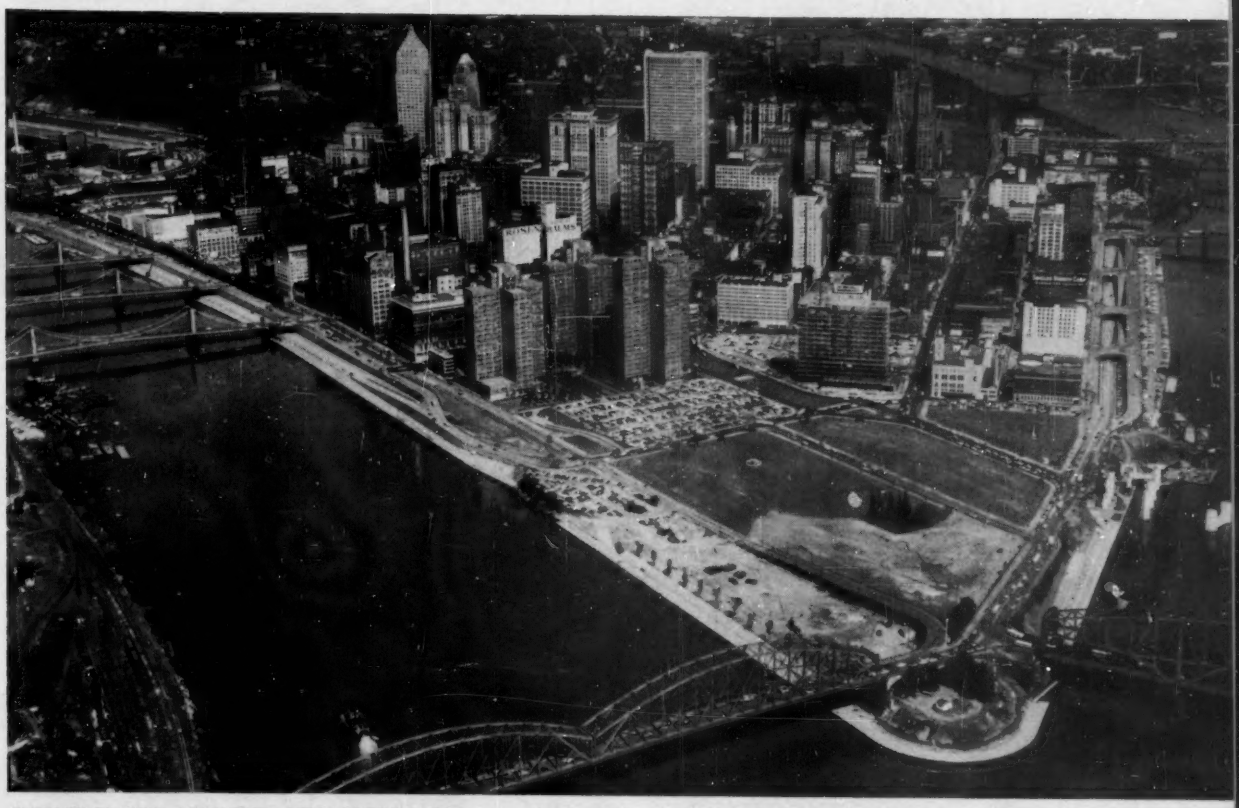


PITTSBURGH'S 'GOLDEN TRIANGLE': Where continuing industrial surge demonstrates that . . .

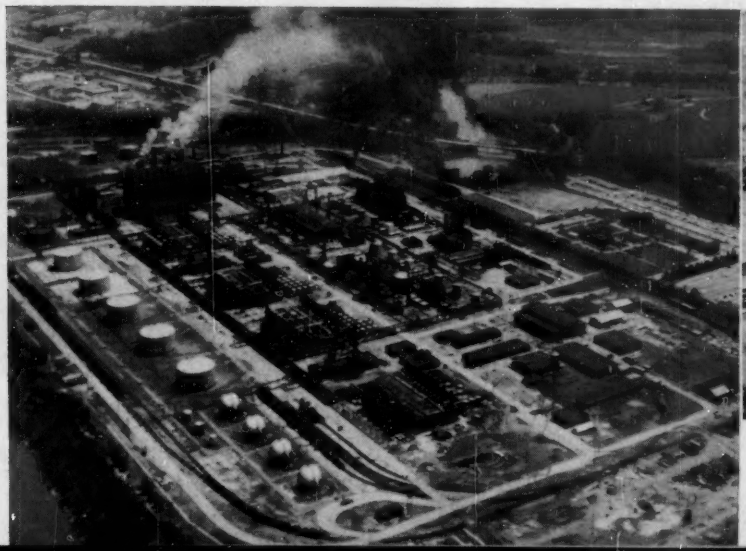
Chemicals 'Arrive' in Coal-Steel Hub

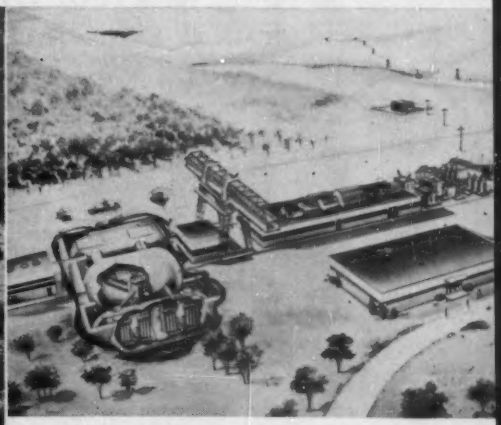
Metals still rule the roost at Pittsburgh and vicinity, but chemicals are rising to an ever higher perch in the coal- and steel-dominated economy of what used to be called the Smoky City.

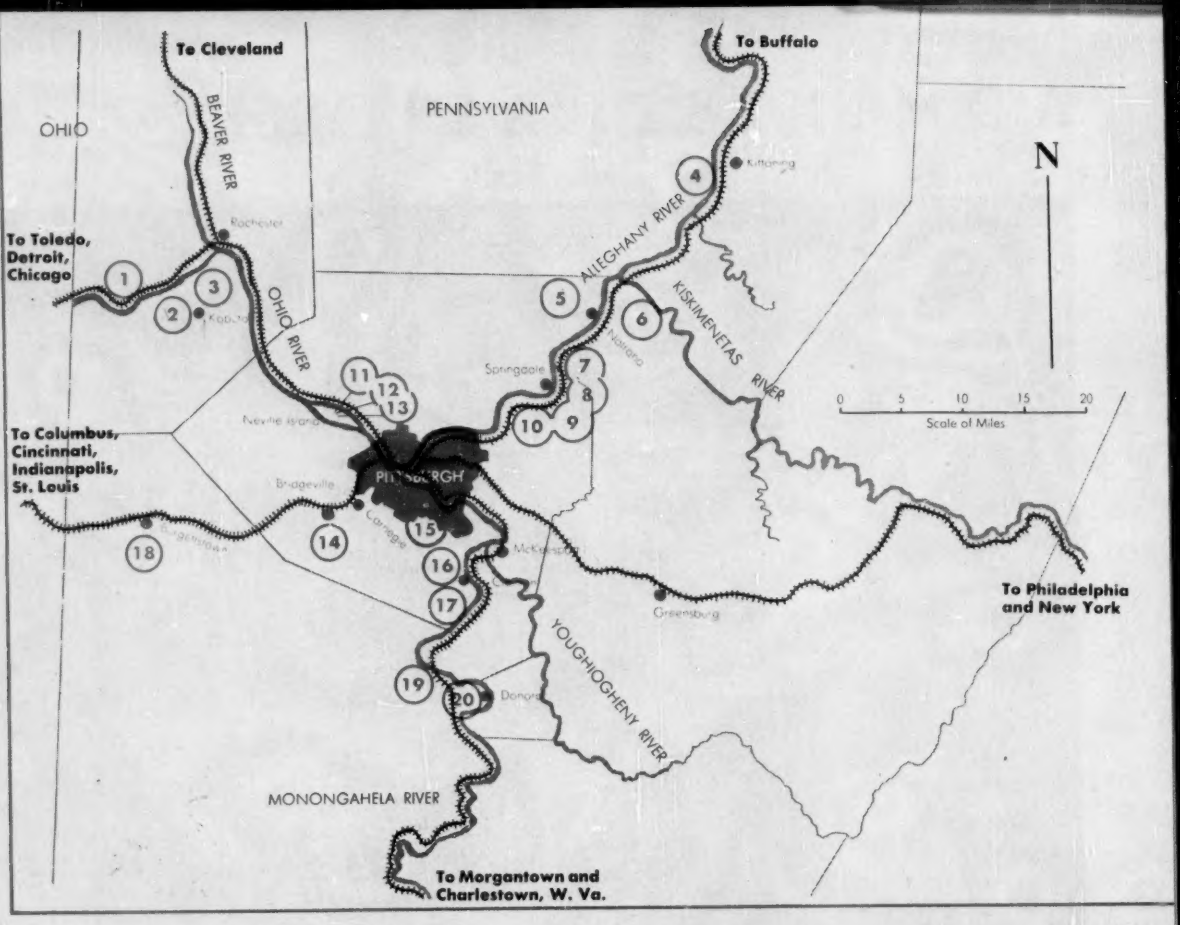
Pittsburgh companies started dabbling in chemicals as side lines, mainly to cash in on coke by-products. Now, output of chemicals and allied products in the seven-county area is worth an estimated $300 million/year, with five major expansion projects (*see table, p. 37*) coming along to boost that total.

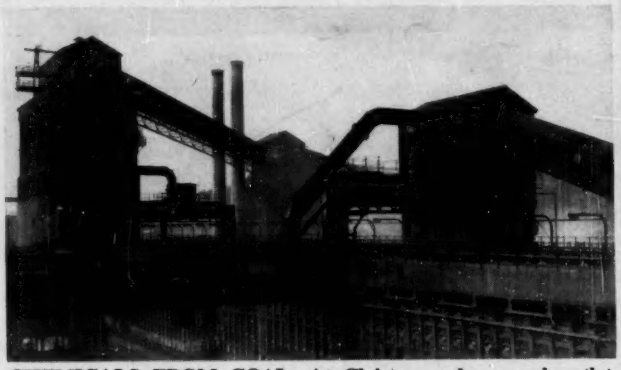
Chemical research, too, is rapidly

SHARING TECHNOLOGY STAGE: Left, plastics at Kobuta; right, planned atomic energy power plant at Shippingport.



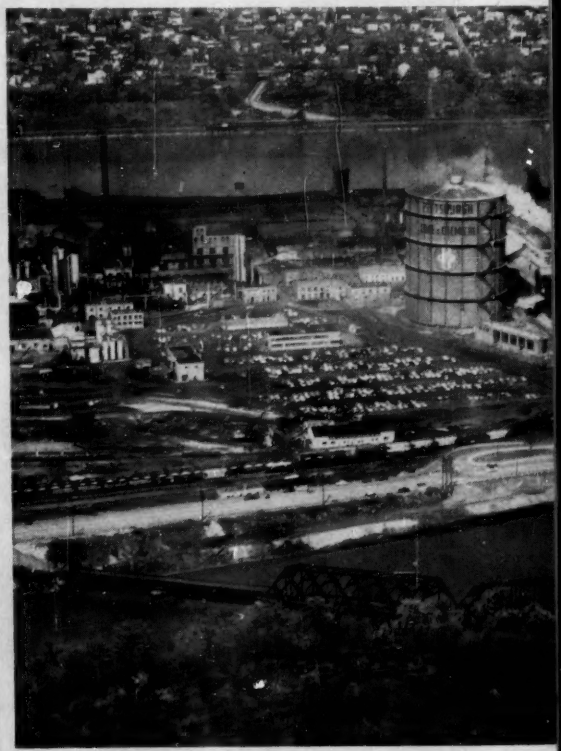






CHEMICALS FROM COAL: At Clairton, coke ovens' outlet.

CHEMICALS BY BARGE: In 1955, a rise to 2 million tons.



SURROUNDED BY WATER: On Neville Island, coal-

CHEMICAL OUTPOSTS IN COAL-STEEL EMPIRE

(Principal chemical plants in Pittsburgh and vicinity)

	Key Company	Location	Principal Products
1	Air Reduction Co.	Midland	Industrial gases
2	Koppers Pittsburgh Co., jointly owned by Koppers and Pittsburgh Plate Glass	Kobuta	Phthalic anhydride
3	Koppers Co.	Kobuta	Styrene, polystyrene, polyethylene, plastic foam
4	Linde Air Products Co., division of Union Carbide and Carbon Corp.	Kittaning	Industrial gases
5	Pennsylvania Salt Mfg. Co.	Natrona	Cryolite
6	Allegheny Ludlum Steel Corp.	Brackenridge	Coke by-products
7	Aluminum Co. of America	New Kensington	Aluminum
8	Olin Mathieson Chemical Corp.	Springdale	Automotive chemicals
9	Pittsburgh Plate Glass Co.	Springdale	Paints, varnishes
10	U. S. Gypsum Co.	Oakmont	Gypsum
11	Neville Chemical Co.	Neville Island	Resins, plasticizers, solvents
12	Gulf Refining Co.	Neville Island	Petroleum products
13	Pittsburgh Coke & Chemical Co.	Neville Island	Coal and coke chemicals and derivatives
14	American Cyanamid Co.	Bridgeville	Naphthalene, phthalic anhydride
15	Jones & Laughlin Steel Co.	Southside	Coke by-products
16	U. S. Steel Corp.	Clairton	Coke by-products
17	Pennsylvania Industrial Chemical Corp.	Clairton	Synthetic resins
18	Climax Molybdenum Co.	Burgettstown	Molybdenum metal and oxide
19	Stauffer Chemical Co.	Monongahela City	Carbon bisulfide, insoluble sulfur
20	U. S. Steel Corp.	Donora	Sulfuric acid, zinc

PRIDE IN PRODUCT: Near Mellon Park, aluminum-clad Alcoa Building.

emicals and derivatives (chemical plants at left).

reaching out in this area (*see table, p. 38*); and this—with all the research and development work being done there on atomic energy*, electrical equipment, metallurgy, petroleum products and glass—promises to make Pittsburgh one of the greatest technology centers of all time.

Two Triumphs to Date: Since Pittsburgh firms ventured into coal chemicals some 30 years ago, the community has pretty well overcome two big obstacles and is off to a start on clearing a third. Eight federally financed dams—plus two more now planned—are counted on to prevent serious flooding. And Allegheny County's smoke control plan—using "instructors" rather than "inspectors"—is credited with having cut visible air pollution by 90%. As to water pollution, the Allegheny County Sanitary Authority has started to build an $82-million sewage interceptor and treatment system that will serve 102 municipalities and about 90 large industrial plants.

There's general agreement that the chemical industry at Pittsburgh is in line for continued growth, though insiders doubt that the growth curve will be very steep. Many factors are

*Six major atomic energy installations in the area—all devoted to non-military applications—are at Shippingport, West Mifflin, Large, Cheswick, East Pittsburgh and Waltz Mill.

MORE CAPACITY COMING

(Principal chemical expansion projects under way or planned in Pittsburgh and vicinity)

- **Air Reduction Co.**—more than doubling of oxygen, argon and nitrogen facilities at Butler.
- **American Cyanamid Co.**—proposed installation of new phthalic anhydride facilities at Bridgeville to increase yields.
- **Koppers Co.**—40% expansion in capacity of resorcinol and adhesives plant at Petrolia; construction cost $1 million.
- **Linde Air Products Co.**—gaseous oxygen plants in design or under construction at six nearby steel mills.
- **Pittsburgh Coke & Chemical Co.**—$3-million construction job started on new phthalic anhydride plant on Neville Island to double present capacity.

favorable, but some vital chemical raw materials have to be shipped in from as far off as Texas. And it's deemed a disadvantage that availability of coke by-products is so dependent on ups and downs of steel production. Also, some executives are apprehensive about labor unrest in the area and about the state's business taxes.

Nevertheless, Pittsburgh is out for diversification, after long being satisfied with its eminent ranking in metals. Chemicals have more than kept pace in the industrial surge since 1945, and may get a tremendous boost from the area's army of researchers.

REDOUBLING OF RESEARCH

(New or enlarged laboratories in Pittsburgh or vicinity for chemical, metallurgical and petroleum research)

- **Crucible Steel Co.**—new research center on 38-acre site on Pittsburgh's Airport Parkway.
- **Gulf Oil Co.**—two new buildings (cost: $2.4 million) added to 30 research buildings at Harmarsville for work on new fuels and lubricants for high compression engines.
- **Hagan Co.**—option to buy 23-acre site on Airport Parkway for headquarters building and research center for work on water softeners.
- **Jones & Laughlin Steel Corp.**—new $2-million research center on Pittsburgh's south side.
- **Koppers Co.**—172-acre site under option at Monroeville for new research laboratory.
- **Mobay Chemical Co.**, jointly owned by Monsanto Chemical Co. (St. Louis) and Farbenfabriken Bayer (Leverkusen, W. Germany)—new laboratory on 15-acre tract on Airport Parkway, across from Crucible Steel's new lab.
- **Pittsburgh Plate Glass Co.**—multimillion-dollar laboratory and control center under construction on 52-acre site near Springdale for work on paints, lacquers, resins and plastics.
- **Pittsburgh Plate Glass Co.**—45-acre tract in Harmar township purchased for future location of new research center for glass products.
- **U. S. Steel Corp.**—In new $7.5-million research center at Monroeville, three buildings constructed and a fourth planned.

Using Salt Efficiently

by **INTERNATIONAL SALT COMPANY, INC.**—America's largest producer of salt

How to Find the Strength of Salt Brines—Accurately

In most of today's plants, the type of hydrometer called a Salometer can generally be used to measure the strength of salt brines most accurately. This device (similar in principle to the hydrometer which checks the condition of your car's battery) is convenient to use—and its scale permits fast calculations for a variety of plant needs. The Salometer scale reads from 0° in pure water to 100° in saturated brine, with each degree representing a percentage of fully saturated brine.

Using the Salometer with maximum accuracy, however, isn't just a matter of reading the scale. A number of simple precautions must also be taken to make sure the Salometer records correct brine strength. Here they are:

1. Check the temperature of the brine. Since most Salometers are calibrated for reading at 60° F., brine temperature should be kept at this level during testing. When other brine temperatures are encountered, it is necessary to use the following table of simple correction factors. These will help provide a completely accurate measurement of brine strength.

APPROXIMATE CORRECTION IN SALOMETER DEGREES

Observed Salometer reading	Subtract per degree below 60° F.	Add per degree above 60° F.
0 to 10	0.049	0.060
11 to 20	0.064	0.082
21 to 30	0.077	0.094
31 to 40	0.087	0.103
41 to 50	0.095	0.112
51 to 60	0.102	0.118
61 to 70	0.107	0.123
71 to 80	0.112	0.128
81 to 90	0.116	0.131
91 to 100	0.120	0.134

For measuring cold brines, such as those used in meat-packing plants, special 38° F. Salometers may be used. Special temperature-correction factors are available when using this type of Salometer to test brines above or below 38° F.

2. Brine should be tested only in a straight-walled cylinder made of clear glass—set on a level surface. Any moisture that collects on the outside of the cylinder should be wiped off before testing procedures start.

3. Salometer stem must be thoroughly dry, clean, and free from grease or caked salt crystals. Also, the Salometer should not touch the sides of the cylinder when readings are taken. It should be read with the stem in a vertical position.

4. Check new Salometers by placing them first in clear water; reading should be 0° S. Then empty the cylinder, rinse with a saturated salt solution, and refill with fully saturated brine; reading should be 100° S. Both water and brine should be at 60° F.

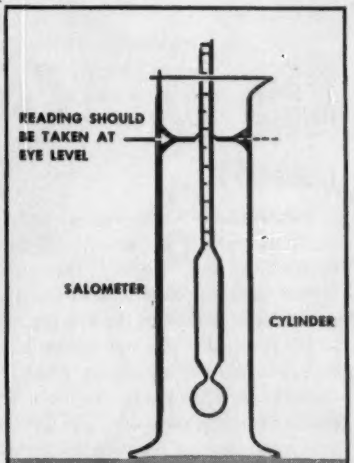


Illustration showing the proper eye level for reading a free-floating Salometer in a straight-walled glass cylinder.

5. Correct reading technique. Brine tends to rise along the sides of a glass cylinder, forming a concave surface known as a meniscus. For correct reading, the eye should be brought to a point level with the *bottom* of this meniscus. Errors of two or three degrees are possible if reading is taken at the point where the brine has risen along the sides of the cylinder.

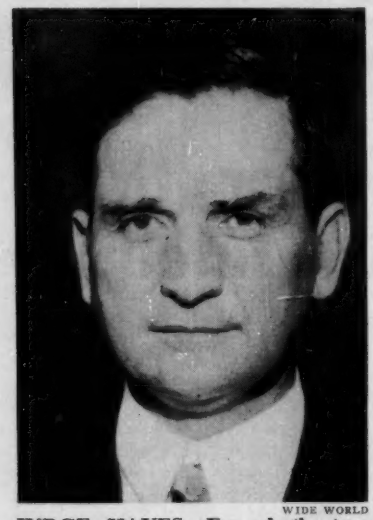
Special Salometers. In the canning industry, where brine is used for quality grading, a different type of Salometer is often used. It's graduated on a scale where 100° S. represents brine containing 25% salt, instead of the normal 26.395%. Special hydrometers may also be used in the tanning or chemical industries. But the same procedures outlined here must always be followed when brine is to be tested—no matter what type of hydrometer a plant uses.

TECHNICAL SERVICE WITH YOUR SALT

Through skilled and experienced "Salt Specialists," International can help you get greater efficiency and economy from the salt or brine you use. International produces both Sterling Evaporated and Sterling Rock Salt in all types and sizes. And we also make automatic dissolvers in metal or plastic for both kinds of salt. So we can recommend the type and size of salt most perfectly suited to your needs.

If you'd like help on any problem concerning salt or brine—or further information on testing brine strength—contact your nearest International sales office.

International Salt Co., Scranton, Pa.
Sales Offices: Atlanta, Ga.; Chicago, Ill.; New Orleans, La.; Baltimore, Md.; Boston, Mass.; Detroit, Mich.; St. Louis, Mo.; Newark, N. J.; Buffalo, N. Y.; New York, N. Y.; Cincinnati, Ohio; Cleveland, Ohio; Philadelphia, Pa.; Pittsburgh, Pa.; Richmond, Va.



WIDE WORLD

JUDGE HAYES: For plastic tape maker, a decree that patents are valid.

LEGAL

'Similar' Products Banned: In federal district court at Greensboro, N. C., Judge Johnson Hayes has upheld the validity of patents held by Minnesota Mining & Mfg. Co. (St. Paul, Minn.) on a vinyl plastic tape used for electrical insulation. Hayes ordered six other concerns — Sears, Roebuck & Co., Chicago; Plymouth Rubber Co. of Massachusetts; Noland Co., Inc., of Virginia; and Dixie Radio Supply Co., Pine State Electric Supply Co. and Scott-Parish Electrical Supply Co., all of North Carolina—to stop producing and distributing similar tapes.

•

Extended Liability: Arkansas' state supreme court has ordered Olin Mathieson Chemical Corp. (New York) to pay the $50,000 judgment assessed last year in a civil liability suit in Union County circuit court at El Dorado. Thus the court brushed aside Olin Mathieson's argument that it should not be held liable for the acts of a truck driver claimed by Olin to be "an employee of an independent contractor."

The truck driver was involved in a collision that resulted in the death of Willie Earl Shirey; Shirey's widow brought suit for $164,000 on behalf of herself and their five children. Attorneys for Olin Mathieson insisted that the truck driver was neither an employee of nor an agent for that company. They explained that Olin had sold some timber in southern Arkansas to Joe Canady, making for a buyer-seller relationship between Canady and Olin, and that Canady then had contracted for Leo Harper, an independent contractor, to cut the timber and haul it into Louisiana, and that the truck driver was employed by Harper. Rejecting this argument, the state's high court held that the truck driver in effect was working for Olin and that Olin was responsible.

•

Bichromate Settlement: A pipe fitter who asserted that his employer failed to provide safe working conditions insofar as handling of sodium bichromate was concerned has settled for $9,000 the $50,000 civil suit he had brought in U.S. district court at Louisville, Ky., against the Louisville & Nashville Railroad. The plaintiff said the compound inflamed his skin, and that he was treated for skin rash once in 1954 and was hospitalized with chromate poisoning for three months in '55.

•

Trademark Rights Recognized: Olin Mathieson's E. R. Squibb & Sons division has settled out of court the trademark suit filed earlier this year by Helene Curtis Industries, Inc. Squibb acknowledges Curtis' rights to the "Spray Net" trademark for a hair preparation, and will have until Aug. 31 to dispose of its stocks of "Spray Hair Net" packaged before March 31.

LABOR

Tailor-made Work Force: The increasing extent to which chemical companies are building their own skilled work forces is seen in last fortnight's presentation of the first diploma to be awarded in the apprentice training program at Monsanto Chemical Co.'s Texas City plant. As more and more chemical workers go through craftsman training plans of this nature, the industry acquires an ever greater stake in low employee turnover ratio and—partly because of higher labor costs for skilled workers and their enhanced technical competence—an ever greater economic interest in further automation of production.

•

Union Spurs Output: It isn't every labor union that's telling its members they shouldn't spare themselves in

WIDE WORLD

UNIONIST MORESCHI: For members, an exhortation to boost output.

"giving out' for the employer. But the Minneapolis chapter of Joe Moreschi's International Hod Carriers' Building and Common Laborers' Union (AFL-CIO) is going so far as to emphasize to members that "we do less than we ought to if we do less than we can do."

•

I. R. Capital: Concentration of the chemical industry's industrial relations executives in New York City will rise this summer when the general industrial relations department of Union Carbide's Carbide and Carbon Chemicals Co. completes its move to Manhattan from South Charleston, W. Va.

•

Layoff Cycle: One chemical plant touched by the layoff cycle stemming from lower production in the auto industry is Du Pont's rayon plant at Richmond, Va., where about 130 employees were to be laid off. Much of the output goes into auto tires.

•

More Long Contracts: Two more chemical process companies are joining the move toward longer wage agreements. At Rensselaer, N.Y., General Aniline & Film Corp. and the International Chemical Workers Union (AFL-CIO) have signed a two-year pact calling for a 9¢/hour wage increase now and an additional 7¢ rise next year; and at Corner Brook, Newfoundland, Bowaters Newfoundland Pulp & Paper Mills and four mill unions have announced a two-year contract—called "the best this year in

for the paint, varnish and lacquer industry

acetone
n-butyl acetate
ethyl acetate
2-ethylhexyl alcohol
isobutyl acetate
isobutyl alcohol
isopropyl acetate
Tecsol®
(95% proprietary ethyl alcohol)

cellulose acetate
cellulose acetate butyrate

dibutyl phthalate
diethyl phthalate
dioctyl phthalate (DOP)
di-isooctyl phthalate (DIOP)
di-(methoxyethyl) phthalate
dimethyl phthalate
di-isobutyl phthalate
plasticizer 84-an
octyl butyl phthalate

Epolene®
(Eastman polyethylene wax)

Stocks of most of these Eastman chemicals are carried in the larger industrial centers of the United States.
For further information, write or call our nearest sales office.

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SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tenn.; New York City; Framingham, Mass.; Cleveland; Cincinnati; Chicago; St. Louis; Houston. **West Coast: Wilson Meyer Co.**, San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

ADMINISTRATION

Canada"—bringing a 12¢ across-the-board increase now and an automatic 5% increase next June.

KEY CHANGES

Paul L. Davies, to board chairman; and **Ernest Hart,** to president; Food Machinery and Chemical Corp. (San Jose, Calif.).

Richard E. Brainard, to vice-president, Shulton, Inc. (Clifton, N.J.).

C. W. Bentley, to vice-president, Colt's Plastics Co., Inc. (New York).

Philip C. Brownell, to general manager, Ecusta Paper Division of Ecusta Paper Corp. (Pisgah Forest, N.C.).

A. James Fisher, to general sales manager, Metal & Thermit Corp. (New York).

J. William Zabor, to director of research, Wyandotte Chemicals Corp. (Wyandotte, Mich.).

Robert U. Haslanger, to president; **N. C. Robertson,** to vice-president; and **N. C. McGowen, Ed Parkes, George G. Walker, A. A. Talmage, R. S. Morse, K. G. Donald** and **Saunders Gregg,** to directors; Escambia Bay Chemical Corp. (New York).

M. W. Reynolds and **P. C. Buck,** to directors, Acheson Industries, Inc. (New York).

John W. Shier, to general manager, Acheson Colloids Co. (Port Huron, Mich.).

Robert F. Elder, to president, Plax Corp. (Hartford, Conn.).

Lawrence L. Garber, to vice-president in charge of production, H. K. Porter Co., Inc. (New York).

Decker McAllister and **Reed Hunt,** to directors, Chemical Process Co. (Redwood City, Calif.).

Eugene J. Houdry, to board chairman; and **Van Horn Ely, Jr.,** to president; Oxy-Catalyst, Inc. (Wayne, Pa.).

DIED

H. H. Brereton, 62, comptroller, California Oil Co. (Perth Amboy, N.J.), at Woodbridge, N.J.

Lewis E. Howard, 80, president, Howard Chemical Co. (Buffalo, N.Y.), at Buffalo.

Another client benefits from a BMC "Precious Plus"

Esso Unit Completed ... 21 days early!

To meet urgent production needs, a quick, quality job was desired on construction of a new process unit at an Esso Standard Oil Company refinery.

BMC Engineering accepted the challenge . . . and with a Key Man* in charge, put the unit on stream — at full capacity — *twenty-one precious days ahead of schedule!*

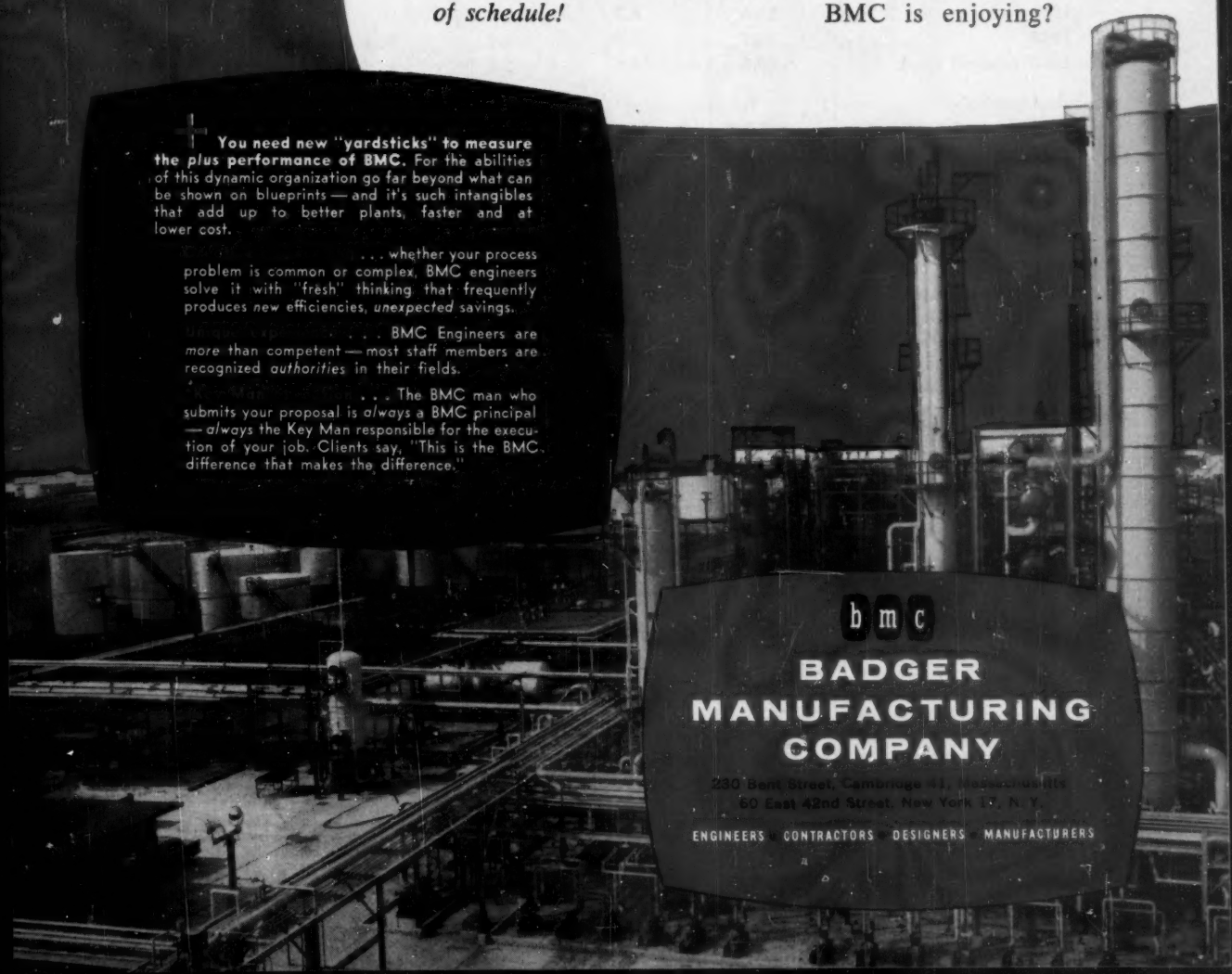
Speed was the need — with efficiency, of course. This was the "Precious Plus" in BMC's performance which never can be shown on blueprints — for it is the product of many intangibles. Other leading companies, too, find BMC's *plus* in performance of *precious* advantage. How else explain the unusual growth BMC is enjoying?

You need new "yardsticks" to measure the *plus* performance of BMC. For the abilities of this dynamic organization go far beyond what can be shown on blueprints — and it's such intangibles that add up to better plants, faster and at lower cost.

. . . whether your process problem is common or complex, BMC engineers solve it with "fresh" thinking that frequently produces *new* efficiencies, *unexpected* savings.

. . . BMC Engineers are *more* than competent — most staff members are recognized *authorities* in their fields.

. . . The BMC man who submits your proposal is *always* a BMC principal — *always* the Key Man responsible for the execution of your job. Clients say, "This is the BMC difference that makes the difference."



bmc

BADGER MANUFACTURING COMPANY

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ENGINEERS CONTRACTORS DESIGNERS MANUFACTURERS

RACE FOR GLOBAL CHEMICAL MARKETS

(Chemical exports, million dollars*)

	U. S.	U. K.	W. Germany & Austria	France	Benelux	Canada
Inorganic Chemicals						
1952	78.3	85.9	64.9	46.7	40.3	34.6
1954	93.1	85.3	94.4	49.1	45.4	44.7
1955 (annual rate)	94.1	91.4	103.0	55.5	50.0	45.5
Fertilizers						
1952	29.8	35.3	75.7	42.7	127.7	43.2
1954	39.4	19.7	98.9	48.2	124.9	43.7
1955 (annual rate)	64.4	12.2	110.8	41.7	131.0	58.2
Chemical Materials not elsewhere specified						
1952	163.3	137.1	48.9	25.8	61.3	59.2
1954	234.9	107.1	127.0	3[illegible].4	65.2	101.3
1955 (annual rate)	287.0	163.6	149.0	46.3	69.7	126.0
Essential Oils						
1952	20.6	6.7	0.9	20.0	8.7	8.5
1954	25.7	7.0	1.9	28.0	11.3	11.6
1955 (annual rate)	26.8	8.9	2.8	25.4	13.5	10.4
Organic Chemicals						
1952	167.2	17.8	89.0	30.0	19.4	11.4
1954	184.9	76.5	146.7	30.5	26.3	13.6
1955 (annual rate)	200.0	56.4	149.0	40.8	28.8	19.1
Coal Tar Dyes						
1952	16.9	2.9	34.3	7.7	2.1	1.9
1954	23.3	31.9	65.8	14.1	——	4.5
1955 (annual rate)	22.2	29.3	63.5	11.9	4.7	5.6
Paints						Italy
1952	78.6	64.0	15.0	9.1	18.2	1.3
1954	105.1	50.4	22.7	9.6	18.9	2.0
1955 (annual rate)	106.0	57.6	25.6	8.9	16.1	2.0
Drugs						
1952	221.8	88.3	29.9	54.6	16.2	10.1
1954	244.8	94.0	49.7	64.8	24.9	16.1
1955 (annual rate)	225.4	104.2	52.0	62.6	28.9	16.5
Soaps and Cosmetics						
1952	40.4	50.3	6.6	34.9	7.0	0.3
1954	39.3	58.7	11.5	39.4	12.3	0.5
1955 (annual rate)	42.0	68.4	12.8	39.4	13.6	0.5
Total**						Canada
1952	822.5	515.4	378.9	286.7	318.9	149.8
1954	1,031.0	570.8	636.0	336.0	341.6	198.9
1955 (Jan.-Sept.)	824.7	481.8	516.3	259.2	277.2	178.7
1955 (annual rate)	1,100.0	641.0	688.0	346.0	369.0	238.0

**Includes chemicals not listed above.

HOW THE FIELD LINES UP

(Chemical exports, million dollars*)

FROM:	1952		1953		1954		1955 (annual rate)	
	U. S.	Free Europe	U. S.	Free Europe	U. S.	Free Europe	U. S.	Free Europe
TO:								
Canada	165.8	18.3	188.4	27.0	167.8	26.6	195.2	28.4
Latin America	328.9	123.7	302.4	136.4	336.3	194.1	334.4	183.5
Middle East	24.0	65.9	16.9	78.5	19.9	102.4	20.3	120.8
Africa	23.8	164.6	17.8	125.8	23.3	161.6	24.8	192.0
Asia	109.9	252.2	118.3	330.9	99.1	239.4	144.8	379.1
Australia and New Zealand	8.5	52.2	9.1	53.9	15.0	88.6	15.9	98.0
Free Europe	160.3		159.2		248.9		277.5	
Communist Bloc		51.2		54.0	0.2	86.7	0.4	102.1
Others	1.4	120.9	24.7	71.2	120.8	54.5	86.3	176.4
U. S.		118.6		137.8		220.7		110.9
TOTAL	822.5	967.7	836.8	1,015.5	1,031.4	1,174.6	1,099.6	1,401.2
Intra-European Trade		716.5		787.0		978.3		923.8

No Place for "Export Complacency"

Next month, new tariff concessions for chemicals become effective in 22 member nations of the General Agreement on Tariffs and Trade (GATT). And, U.S. chemical exporters are hoping that the cuts will mark an end to the era of American "export complacency."

"Complacency" is the word that best characterizes the course of the U.S. in global chemical selling. In the years 1952-55, the U.S. upped chemical exports some $277 million above '52's $822.5 million (*see box above*); Europe's trade, however, jumped about $532 million over '52's $967.7 million.

Slipping U.S. chemical exports show up most in the underdeveloped nations. In Latin America, for example, the U.S. held about 71.5% of the chemical market in 1952, compared with Europe's 27%; in 1955, the U.S. share was only 60%, while Europe's was 36%.

No single country can claim credit for Europe's climbing chemical exports. West Germany has helped spark the boom in almost all categories (*see tables at left*), with increases ranging from 62% for inorganic chemicals to over 200% for essential oils and unspecified chemicals, but other nations—the United Kingdom in coal tar dyes and inorganics, Italy in drugs—have also posted big gains.

U.S. failure to match European advances in world chemical sales, assert industry executives, stems from four main factors:

Countries included in each area:

Free-Europe:	U. K., W. Germany, France, Benelux, Scandinavia, Austria, Turkey, Italy, Greece.
Middle East:	Egypt, Syria, Saudi-Arabia, Jordan, Israel, Lebanon, Iran, Iraq.
Asia:	Pakistan, India, Burma, Thailand, Indonesia, Indo-China, Japan, Formosa, Korea, Malaya Peninsula, Singapore, Hong Kong.
Africa:	All the continent except Egypt.
Communist Bloc:	U.S.S.R., Poland, Czechoslovakia, East Germany, Rumania, Hungary, Bulgaria, Albania.
Scandinavia:	Norway, Sweden, Denmark, Finland.

- Complacency. Domestic producers are satisfied with their growth to date, are confident that they'll retain a substantial export trade because Europe cannot entirely fill growing world requirements. Too, the U.S. is not as dependent upon exports as is Europe.
- Prices. European competitors generally offer more attractive prices than do U.S. chemical companies.
- Credit. Payment terms offered by U.S. firms are more severe than those of European sellers, whose credit is backed by bank or governmental guarantee.
- Trade agreements. European countries often receive preferential tariffs from countries that once were —or still are—colonies.

Little has been done to counter these advantages enjoyed by the Europeans. And that poses a question: "Can the U.S. count on continuing growth if export markets are subordinated to domestic markets?" The answer from some chemical marketing people: "Definitely not." Their reasoning:

- Trade balance. The U.S. is in-

*All figures are from the United Nation's Commodity Trade Statistics. The groupings used are the Standard International Trade Classifications. Annual rate figures have been calculated from data for January-September period.

SALES

creasingly becoming a "have-not" nation in raw materials. If dollar value of increased imports doesn't approximately equal that of exports, inflationary pressures will devaluate the currency in real terms. This could lead to lower real consumer income, higher wage demands.

• New capacity. Plants built abroad by foreign firms pare the markets for U.S. producers. And many underd. eloped regions restrict the profits one can bring home.

Export-minded chemical sales managers, however, see a two-point solution; the U.S. should step up overseas chemical investments and stress sales of useful new products to foreign buyers. Such a policy would boost chemical investments abroad well above the $1.7-billion (mostly by oil companies) expected by 1975.

That course, say chemical marketers, plus the GATT tariff concessions will help destroy "export complacency" and keep the U.S. on top in global chemical sales.

DATA DIGEST

• **Epoxy compounds:** Separate bulletins describe octylene, dodecene and C_{16}-C_{18} olefin oxides. Structure, properties, chemistry and possible applications are described. Becco Chemical Division, Food Machinery & Chemical Corp. (New York).

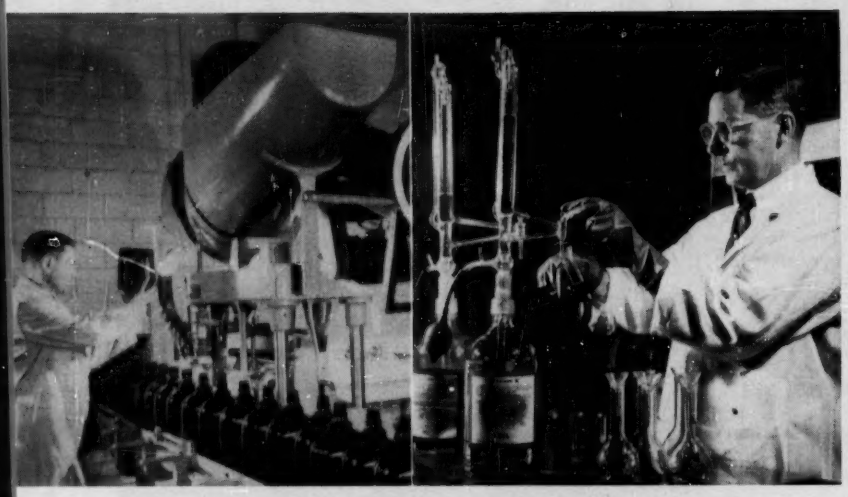
• **Acetophenone:** 8-p. folder gives data on specifications, solubility, constant-boiling mixture, typical reactions and potential uses. Carbide & Carbon Chemicals Co. (New York).

• **Cyclohexanone:** 17-p. brochure outlines physical, chemical and solvent properties of the compound, suggests uses in rubber-base compositions, paint remover, plasticizer and insecticide formulations. National Aniline Division, Allied Chemical & Dye Corp. (New York).

• **Nitroparaffins:** 47-p. booklet contains texts of papers presented at various symposia. Commercial Solvents Corp. (New York).

• **Propylene diamine:** Folder gives information on physical and physiological properties and suggested applications. Carbide and Carbon Chemicals Co. (New York).

• **Fatty acids:** 4-p. brochure tabulates specifications and components of the company's products. A. Gross & Co. (New York).



AUTOMATIC packaging (at Fisher) and the chemist's choice help stir a . . .

Tempest in the Bottle

Chemical purchasing agents and researchers are at the center of an erupting international controversy over liquid reagent bottling. British Drug Houses Ltd. is beginning to sell fluid reagents in Canada by metric volume (10, 25, 100, 250, 500 and 1000 ml. sizes) instead of by weight. And J. T. Baker (in the U.S.) is starting to pack its gallon bottle as nearly full as feasible, selling by the weight "as it falls."

These switches follow a move in recent years by Fisher Scientific to sell by avoidupois volume. Other domestic and Canadian reagent supliers, however, are staying put, watching the outcome.

Users and buyers view the move differently. Chemists, claims Fisher, prefer capacities marked by volume. And the standardization in bottle sizes (reducing the number from 50 to 4) saves on shelf and warehouse space. The company credits the switch with a major share in doubling of its reagent sales in the past three years.

Purchasing agents, however, are less enthusiastic. Most bids they receive are on a weight basis; it's human nature to toss aside quotes on any other basis. For Fisher and BDH, this resistance has meant lengthy talks with purchasing agents to explain the advantages (often in price). And that, says Fisher, is small price to pay for the manufacturing benefits of volume packaging. The benefits:

- Automatic machinery. Conversion to a few standard bottle sizes has facilitated the use of high-speed automatic filling machinery.
- Shipping containers. Carton standardization on a few sizes is possible.
- Inventory. Multiplicity of bottle sizes led to inadequate inventories; now sufficient stocks can be carried to meet demand.
- Saving. The advantages of automation—fewer bottle and carton sizes—have produced substantial cost reductions.

Trade Reaction: With the exception of Fisher and BDH, no other reagent producer is currently considering a switch to volume or, as J. T. Baker is doing, to weight and volume. One large manufacturer terms the conversion "plainly a sales gimmick. We haven't noticed any Canadian chemists screaming for liquids by volume." The same company also discounts the economies of standardized containers, points to the need for an adequate vapor chamber in the bottle, BDH and Fisher counter this argument by pointing out their modified bottle closure. BDH uses a double seal; Fisher, a polyethylene insert in the cap to give a tighter fit.

Some companies, however, such as Anachemie Chemicals Ltd. and Mallinckrodt Chemicals Ltd., although selling by weight now, are not taking sides; they will follow whatever customer perference develops.

If the trend develops, most suppliers would like to see metric-volume packaging adopted. Meanwhile, chemists and buyers can take their pick of weight- or volume-labeled bottles.

Funds for Facts

The anguished cries that rose from businessmen when cuts were proposed in the operating expenses of the Commerce Dept.'s Business Statistics Services are quieting down. Reason: this year's fiscal budget will be about the same as last year's.

It's hardly a purr of contentment that's replacing the outraged voices, however. Most users had hoped the department could expand its statistical activities (e.g., Survey of Current Business, The Chemical and Rubber Industry Report, export-import data). With $1,295,000 lopped off the department's request for the fiscal year beginning July 1, there's little chance that business statistics will encompass any new fields.

Here's the rundown:

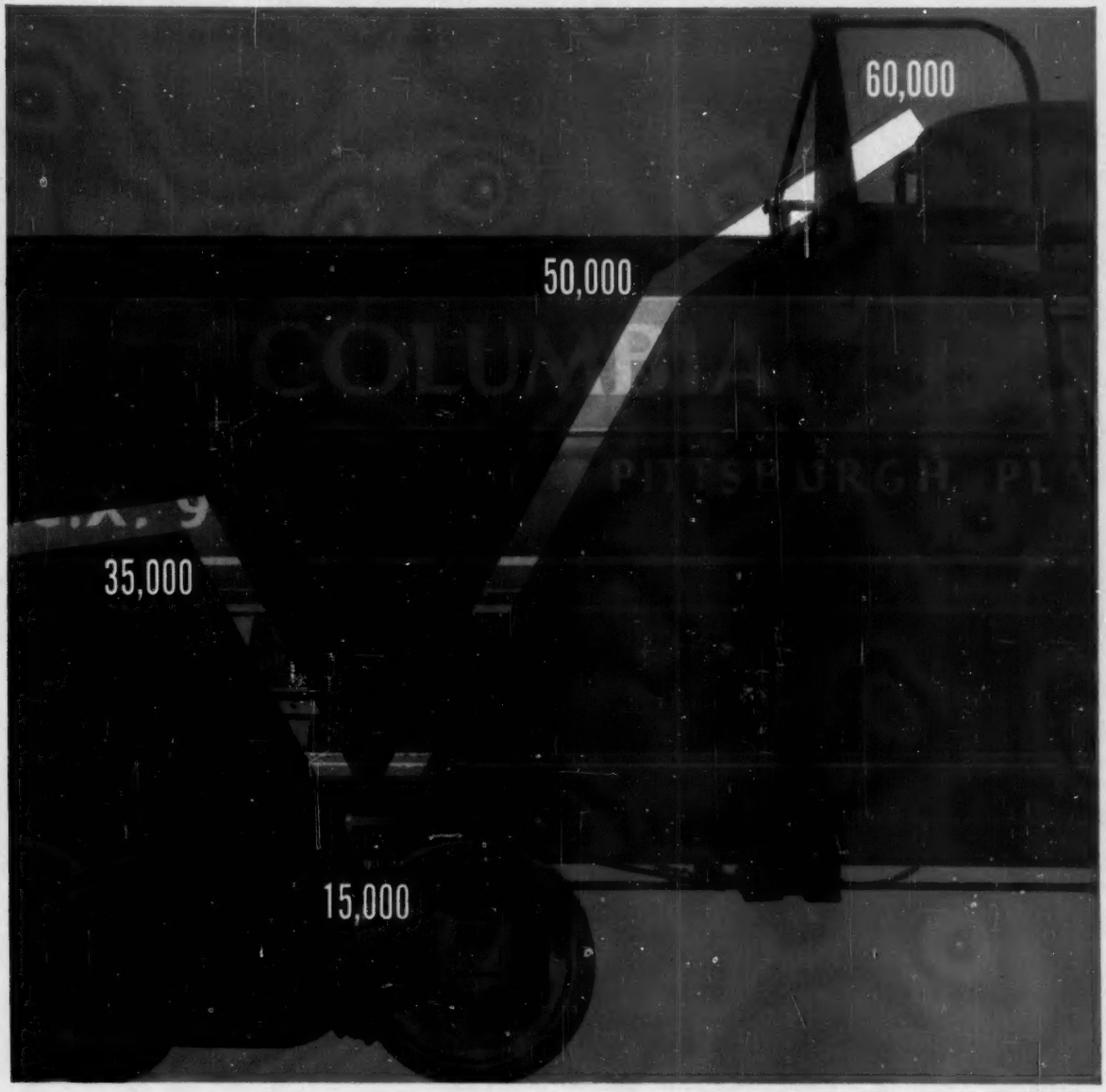
Census Bureau will have $7,475,000 to spend on its recurring, regular programs, up $62,000 from last year. The additional money will be used to expand work on foreign trade and retail inventory figures. Turned down: $83,000 for surveying county business patterns and other studies.

For the bureau's nonrecurring programs, Congress okayed $150,000 to plan a 1958 census of transportation, manufacturing and mineral industries, and $1 million—$800,000 less than sought—for a national housing inventory.

The Office of Business Economics will have $960,000, same as last year, to spend in fiscal '57. Denied: an additional $240,000 to expand present programs on consumer expenditures, manufacturer inventories, plant and equipment expenditures and business starts and discontinuances.

Business and Defense Services Administration wanted $600,000 for a special construction survey, got none of it.

The total, $10,375,000, is slightly more than what Statistical Services got last year. But to those who use the services, the attitude is that an open hand, not a tight fist, would have been much better.



How many tank cars of liquid chlorine would you say were produced last year?

Total production of liquid chlorine by America's chemical industry in 1955 was an estimated 3,407,935 tons.

This represents an increase of 38% since 1950 and an increase of 65% since 1945.

Based on 55 ton capacity cars, last year's chlorine production was enough to fill a string of 61,962 tank cars.

Chlorine continues to grow. This year, Columbia-Southern remains the leading merchant producer of chlorine.

Columbia-Southern's sales, traffic, and technical departments are always ready and pleased to assist you with your chlorine problems.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION

SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY

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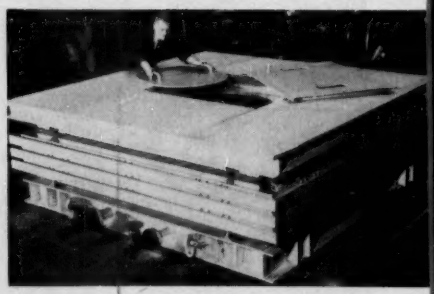
DISTRICT OFFICES: Cincinnati • Charlotte • Chicago Cleveland • Boston • New York • St. Louis • Minneapolis New Orleans • Dallas • Houston • Pittsburgh • Philadelphia • San Francisco

IN CANADA: Standard Chemical Limited and its Commercial Chemicals Division



COLLAPSED, container is only 3 ft. high, will support dry cargo.

Every Ship a Tanker

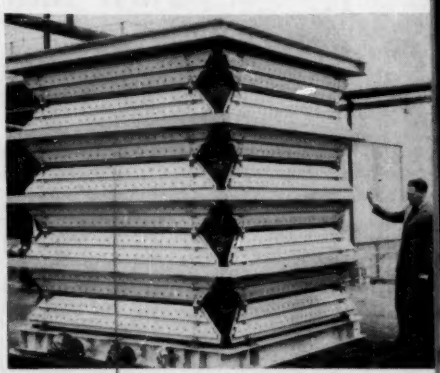
LIQUIDS can now be carried in holds of dry-cargo vessels. How? By use of a collapsible tank recently introduced by R.&H. Green and Silley Ware of London. The tank is a fabric-reinforced synthetic rubber bag supported by a light alloy, accordion-type frame. (*see cuts*). Return cargoes are stacked on top of collapsed unit.

Present tanks are used chiefly for petroleum products but coming up are some new designed specifically for edible oils, milk, and wine. Three sizes are available: 1,620, 2,260, and 2,900 gals., weighing 2, 2¼, and 2½ tons respectively.

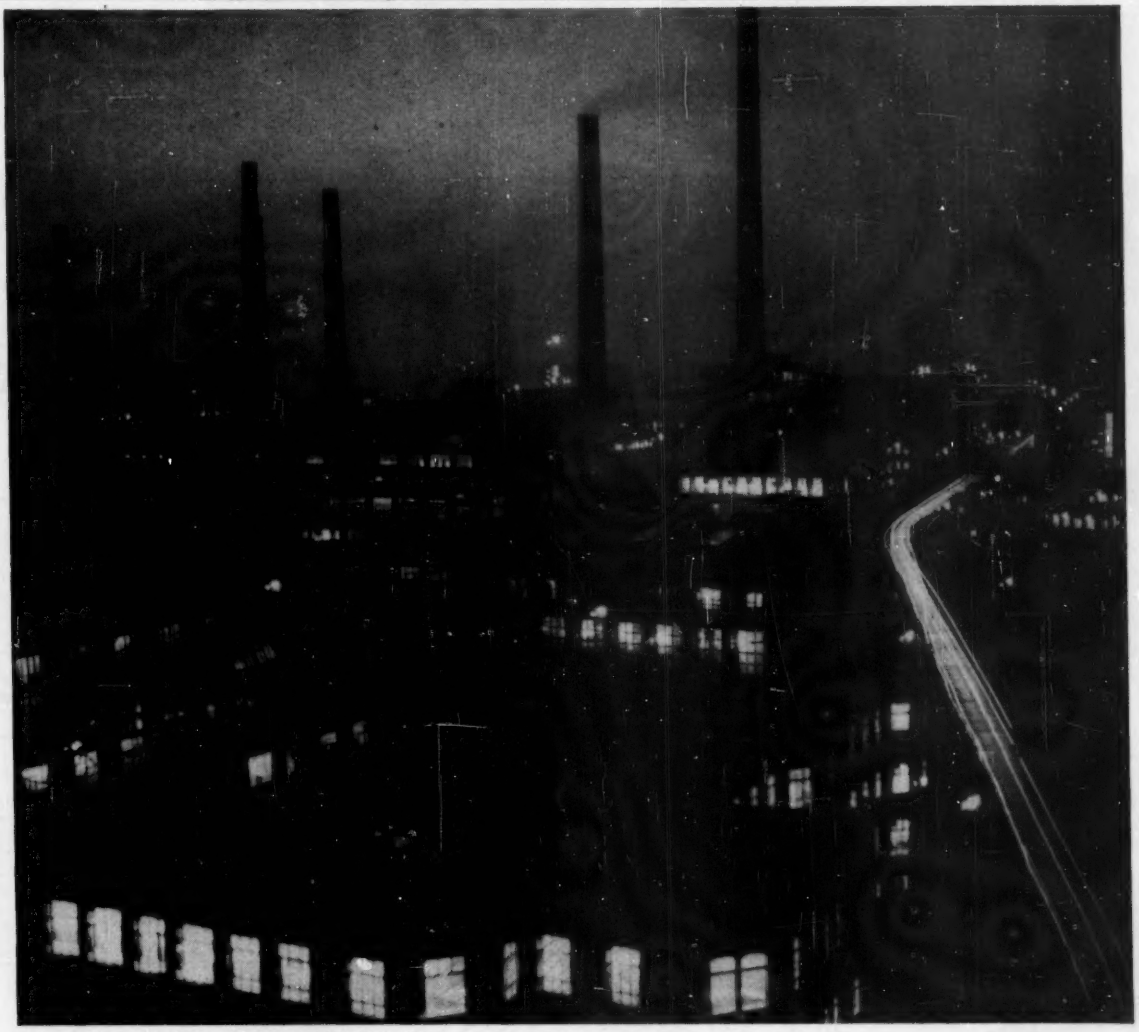
Now, bags must be filled with air before liquids are poured in. But on tap are models that can be filled and inflated simultaneously.

To clean, you insert a tank washing machine through the top of the collapsed tank, raise the tank around the machine, drain at the bottom.

Uses are seen for the container in truck and rail hauling. Another possibility: use in air freighters to supply isolated bases with fuel.



OPEN, container holds 2,900 gals. of liquids, allows round-trip pay loads.



MAIN PLANT OF FARBWERKE HOECHST, NEAR FRANKFURT

C W Report

Like so many phoenixes, West German chemical plants are again rising on the competitive scene. U. S. industrialists, seeking clues to tomorrow, must know. . .

Just How Big a Comeback Are the Germans Making?

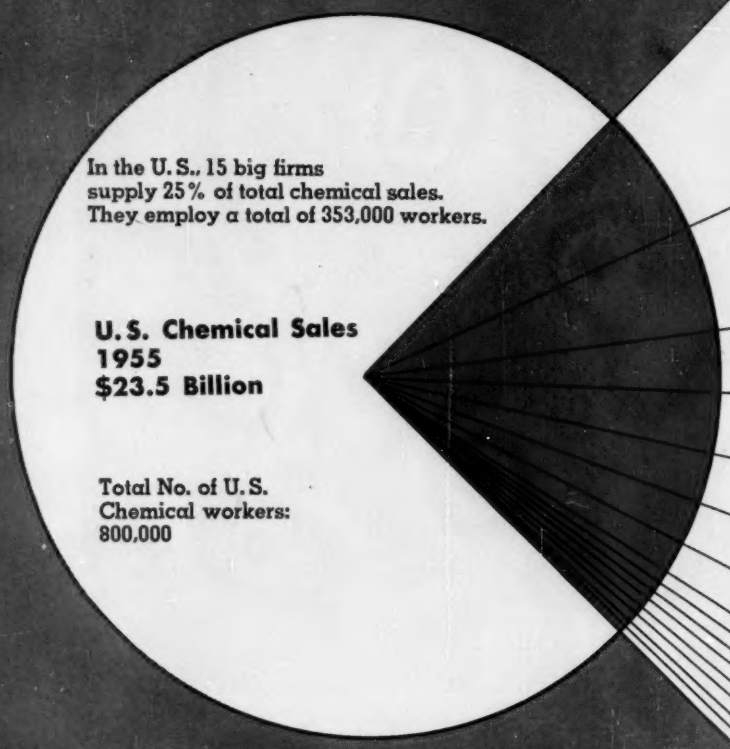
by Karl Falk

Like Humpty Dumpty, the German chemical industry took a great fall. But West German industrialists, with more ingenuity than all the king's men, (and an assist from the swing of the political pendulum) put their chemical industry together again.

Starting in earnest seven years ago, they worked rapidly and built solidly. As a result, the West German chemical industry today is proving a tough competitor for U.S. chemical makers in world markets.

The West German recovery raises two urgent questions for U.S. chemical makers: Just how big a comeback are the Germans making? How much of a threat does it pose to U.S. leadership? Here, in a comparison of the two chemical industries, are some of the answers.

How Many Share the Big Slice



In the U.S., 15 big firms supply 25% of total chemical sales. They employ a total of 353,000 workers.

U.S. Chemical Sales
1955
$23.5 Billion

Total No. of U.S. Chemical workers: 800,000

Sales in millions of dollars Employees in Thousands	Workers	Sales
Du Pont	90	$1,909
Union Carbide	70	1,187
Allied Chemical	29	628
Olin Mathieson	36	560
Monsanto	19	522
Dow	21	522
American Cyanamid	23	451
Hercules Powder	11	227
Pfizer, Chas.	7	164
Rohm & Haas	6	162
Merck	10	158
Eli Lilly	8	141
Parke, Davis	10	123
General Aniline	8	121
Diamond Alkali	5	110

In Germany, the 3 biggest firms supply 25% of total chemical sales. They employ a total of 103,000 workers.

W. German Chemical Sales
1955
$3.4 Billion

Total No. of W. German Chemical Workers: 400,000

Bayer-Leverkusen	40	$317 (est.)
Farbwerke Hoechst	33	302
BASF-Ludwigshafen	30	275 (est.)

HOW THEY RANK

Sales in 1955 of 20 Large Chemical Process Firms

(In Millions of Dollars)

1)	Du Pont	1,909
2)	Union Carbide	1,187
3)	Imperial Chemical Industries	1,151
4)	Procter & Gamble (est.)	989
5)	Eastman Kodak	714
6)	Allied Chemical	628
7)	Olin Mathieson	560
8)	Monsanto	522
9)	Dow Chemical	522
10)	American Cyanamid	451
11)	Schenley Industries	412
12)	Bayer (est.)	317
13)	Hoechst	302
14)	Colgate-Palmolive	286
15)	Badische Anilin (est.)	275
16)	American Viscose	259
17)	Montecatini	228
18)	Hercules Powder	227
19)	CIBA (est.)	184
20)	Celanese	177

C W Report

Export Dependence

Both the U.S. and West German chemical industries enjoy a favorable trade balance, export three times as much as they import.

But West Germany is more dependent on sales abroad, exports four times as much of her chemical production as does the U.S. The U.S. chemical industry, in a country with over three times the population of the Federal Republic of Germany and a gross national product roughly ten times as great, enjoys a larger and faster-growing domestic market.

West Germany's need for foreign trade is evident in its aggressive fight to regain its former position in foreign chemical markets *(see chart, p. 54)*. Up to World War II, Germany led all other nations in chemical exports.

Before World War I, for example, German chemical producers supplied 85% of the world trade in dyes, 40% of the world's pharmaceuticals. Chemical exports were as high as 33⅓% of total ouput.

Any return to such a share of world markets for West Germany seems unlikely, for the present at least. But she has been making rapid strides in recovering markets and in establishing new markets, especially in underdeveloped areas. Last year, for example, West Germany again led the world with 34% of all dye exports. Thus, while trailing the U.S. in actual production, Germany is pressing the U.S. for world leadership in certain chemical exports.

In 1953, West Germany's total chemical exports reached $543 million as against $819 million for the U.S. *(see chart, p. 54)*. Last year, according to Chemische Industrie, West German chemical exports totaled $810 million —up almost 50% over 1953; U.S. chemical exports, however, rose more than 50% to $1.3 billion. Yet, in 1955, total West German chemical sales were only $3.4 billion, compared with $23.5 billion for the U.S.

As these figures suggest, West German chemical firms are better geared to export and are more interested in adapting their products for foreign sales than are their American counterparts. German producers are willing, for example, to go to the trouble of turning out a single foreign order a year for 1 ton of dye—even though filling the order might involve 15 or more production stages and an exceedingly large amount of labor.

This eagerness on the part of the West German chemical industry to cultivate foreign markets is well illustrated by a recent remark of a Colombian importer: "If we send an inquiry, the British never bother to answer our letter; the Americans send us a catalogue in English; but the Germans send us a man."

Tariffs

What nettles these ambitious German chemical makers is the belief that their American colleagues are "carefully guarding their domestic market behind high tariff bulwarks."

Germans complain that U.S. chemical producers don't need tariff protection because of their lower raw material costs and lower unit costs of production for a larger domestic market. If Americans imported products they cannot make as cheaply, claim the Germans, American industry would be free to concentrate on materials it can make more efficiently.

The fact that U.S. duty rates on chemicals, oils, and paints in recent years have run only 13% of the value of dutiable imports of these products would seem to indicate that tariffs have not been a major barrier to importation of West German chemicals, particularly intermediates. At the same time, the West Germans have not hesitated to raise tariffs to protect their own chemical industry. German tariff rates on vitamins, for example, are actually double those of the U.S.

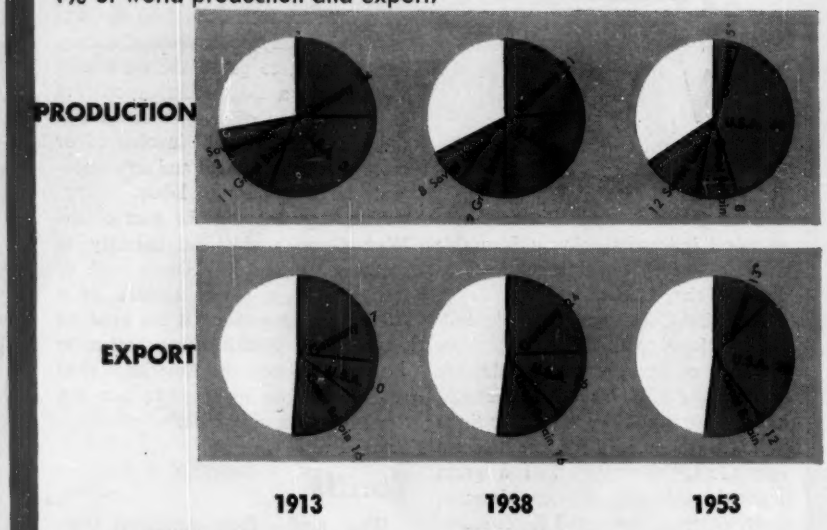
The tariff discussion on both sides of the ocean is not always reasonable.

Production Growth

From 1938 to 1953, Germany's share of world chemical production dropped from 21% to 5%. Over the same period, U.S. contribution to world chemical output jumped from 29% to 40%. This sharp drop in

WHO'S AHEAD IN EXPORTS

(% of world production and export)



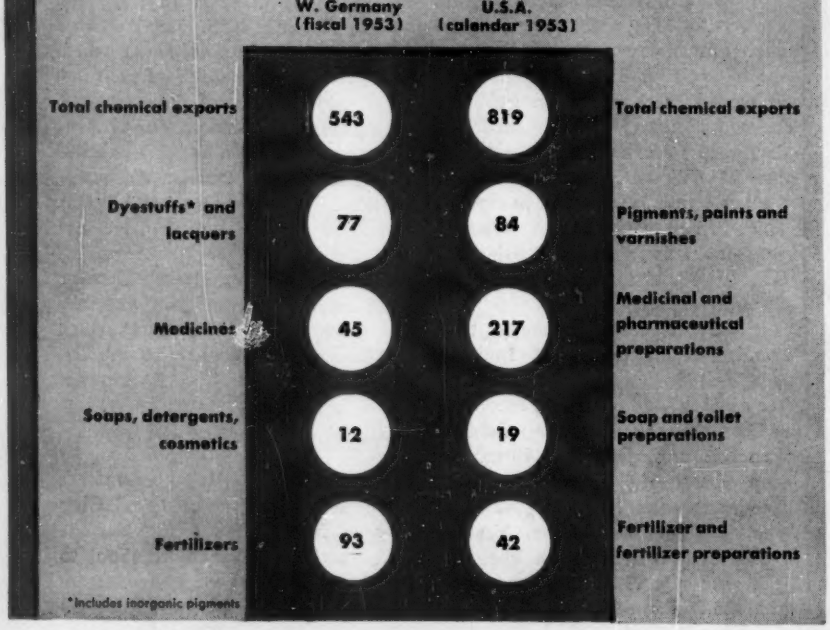
WHAT THEY EXPORT

Selected Chemical Exports of U.S. and W. Germany

Credit: Chemische Industrie; English edition 1/55 Statistical Abstracts of U.S.—1955

While not exactly comparable (note the category differences), these figures give a good indication of the relative status of the two top chemical exporters.

(in millions of dollars)



C W Report

German chemical production and concomitant rise in U.S. output is, of course, largely the result of World War II.

Wartime destruction and postwar dismantling and relocation erased a major share of the German chemical industry. Almost one-third of prewar chemical industry, for example, fell into the hands of the Russians and the satellite East Zone.

But even before World War II, growth rate of the German chemical industry had started to slack. Average annual rates of growth since the mid-30's for American industry in general and for the chemical process industries in particular have been roughly double those of West Germany *(see chart, left)*.

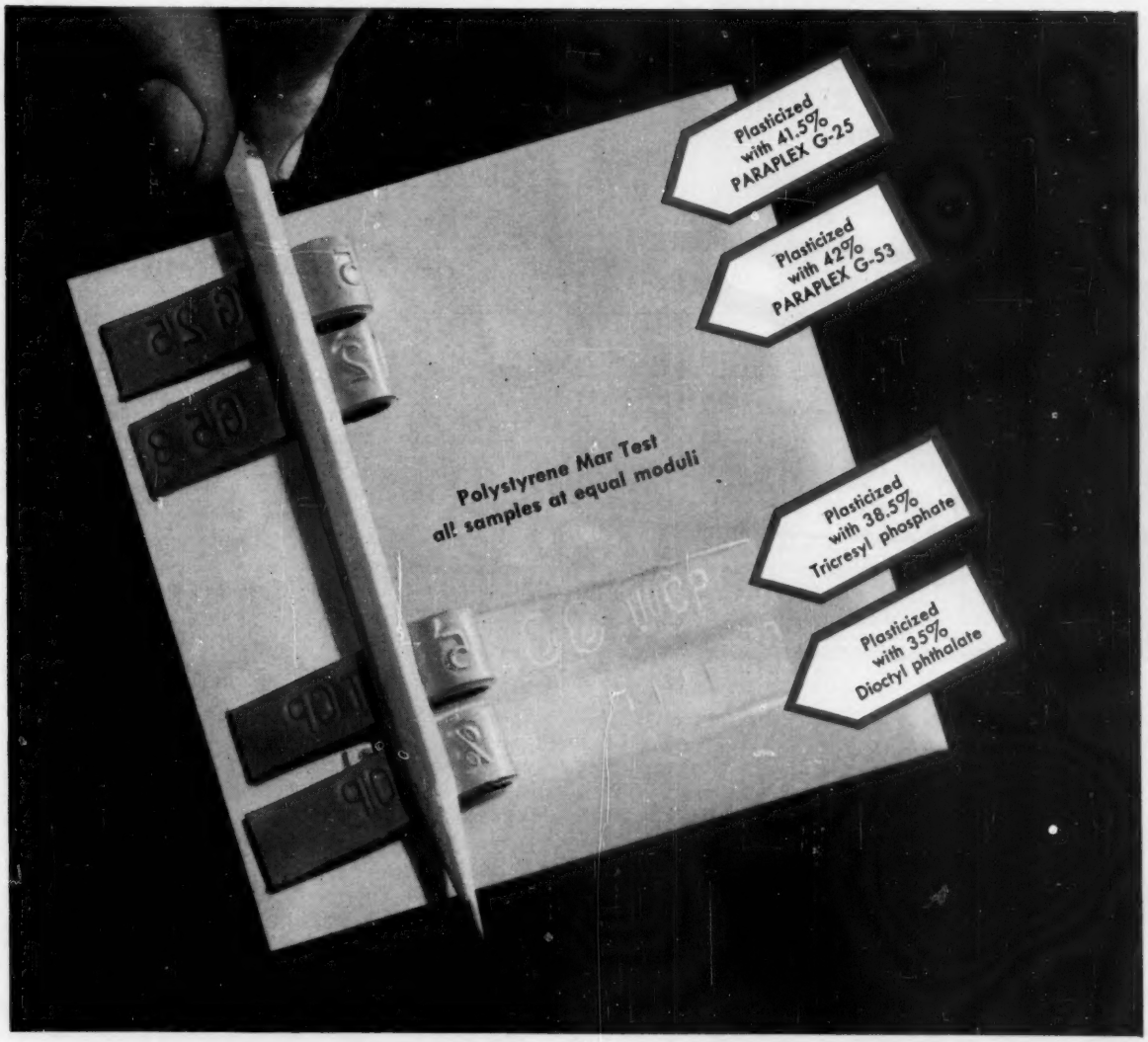
In recent years, per capita investment in new chemical plant facilities and research laboratories has been about four times higher in the U.S. than in West Germany. (The ratio of research spending to sales, however, is higher for the larger German firms than for large U.S. companies.)

But German postwar recovery is still not complete. A rather rapid increase in West Germany's growth rate just within the last three years could, if maintained, considerably narrow the production gap between the two nations.

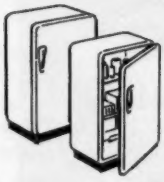
Costly Raw Materials

Of major importance in comparing the production of the two chemical industries is the raw material and power situation. Here, the U.S. has a big edge. German chemical producers must pay three to four times as much for coal, coke, electricity, and natural gas.

In an effort to reduce raw-material cost, the German chemical industry is now turning from coal (Germany's only really plentiful major natural resource) to petroleum. But in this endeavor it is handicapped by limited domestic crude oil and natural gas



Cut down plasticizer migration with PARAPLEX G-53



The test illustrated here clearly shows why polymeric plasticizers such as PARAPLEX G-25 and PARAPLEX G-53 are recommended for use in vinyl compounds which contact polystyrene, lacquers, rubber, and baked finishes.

Take polystyrene for example. Widely used in refrigerators and other appliances, polystyrene is often severely marred by vinyl gaskets containing so-called fugitive plasticizers. When PARAPLEX G-25 or PARAPLEX G-53 is used, migration is drastically reduced and the appearance and physical properties of the polystyrene are virtually unaltered.

PARAPLEX plasticizers provide many other benefits, too. PARAPLEX G-53 is highly resistant to extraction by soaps, detergents, and hydrocarbons. It is extremely non-volatile. And its cost is quite moderate. High molecular-weight PARAPLEX G-25 has all of the physical properties of PARAPLEX G-53—and more.

For more information on *all* of the plasticizers produced by Rohm & Haas Company, ask for *What You Should Know About* PARAPLEX *and* MONOPLEX *Plasticizers.*

PARAPLEX and MONOPLEX are trademarks, Reg. U.S. Pat. Off. and in principal foreign countries.

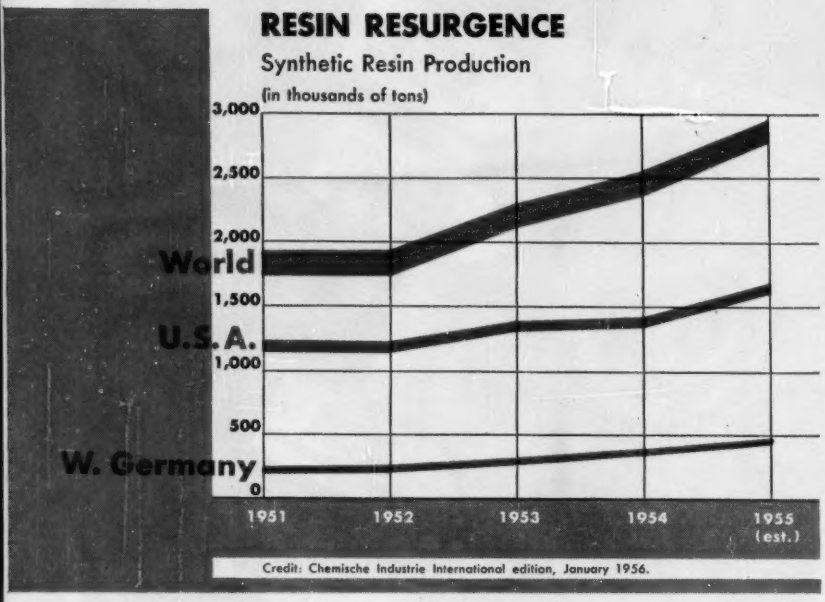
Chemicals for Industry

ROHM & HAAS COMPANY

THE RESINOUS PRODUCTS DIVISION

Washington Square, Philadelphia 5, Pa.

Representatives in principal foreign countries



C W Report

output—only 1/100 and 1/1,250 that of the U.S., respectively.

This unfavorable raw material situation explains why Germany's chemical comeback is moving into specialized lines—dyes, pharmaceuticals, plastics *(see chart above)* and synthetic fibers—rather than into fields calling for inexpensive raw materials.

World trade barriers have had a similar but lesser influence on West Germany's postwar chemical business, channeling it into chemical intermediates and finished specialty products. An important offshoot of trade restrictions is the step-up in exports of German technology, either through licensing arrangements or actual production by West German firms behind high tariff walls of foreign (particularly underdeveloped) countries.

Manpower as Cost

But if the U.S. has the upper hand in raw material supply, West Germany is in a better position where labor is concerned. Labor costs are only about one-fourth to one-third of those in the U.S. The German chemical industry takes full advantage of its labor discount to offset high raw material and power costs. Where it can do so, it substitutes inexpensive manpower for costly coal-based power and scarce hydroelectric power; like the rest of the European chemical industry, it designs process flow lines for small multiple units that require minimum power and maximum operating labor —as opposed to the American practice of designing a single, large unit whose output can be augmented by applying more horsepower *(CW, July 3, '54, p. 44)*.

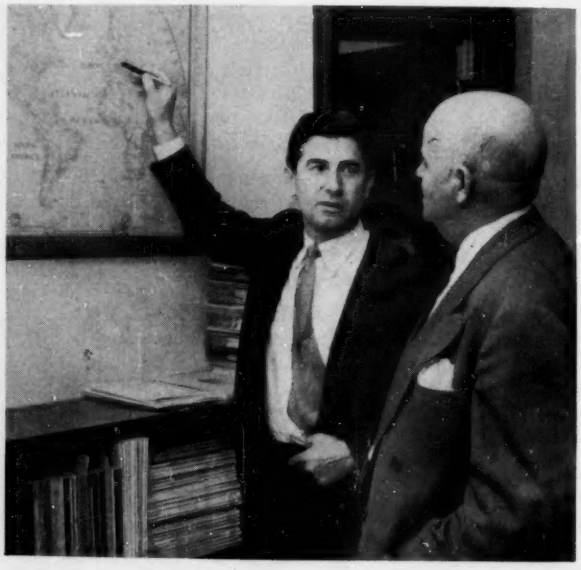
The average West German chemical worker receives 50¢/hour, including

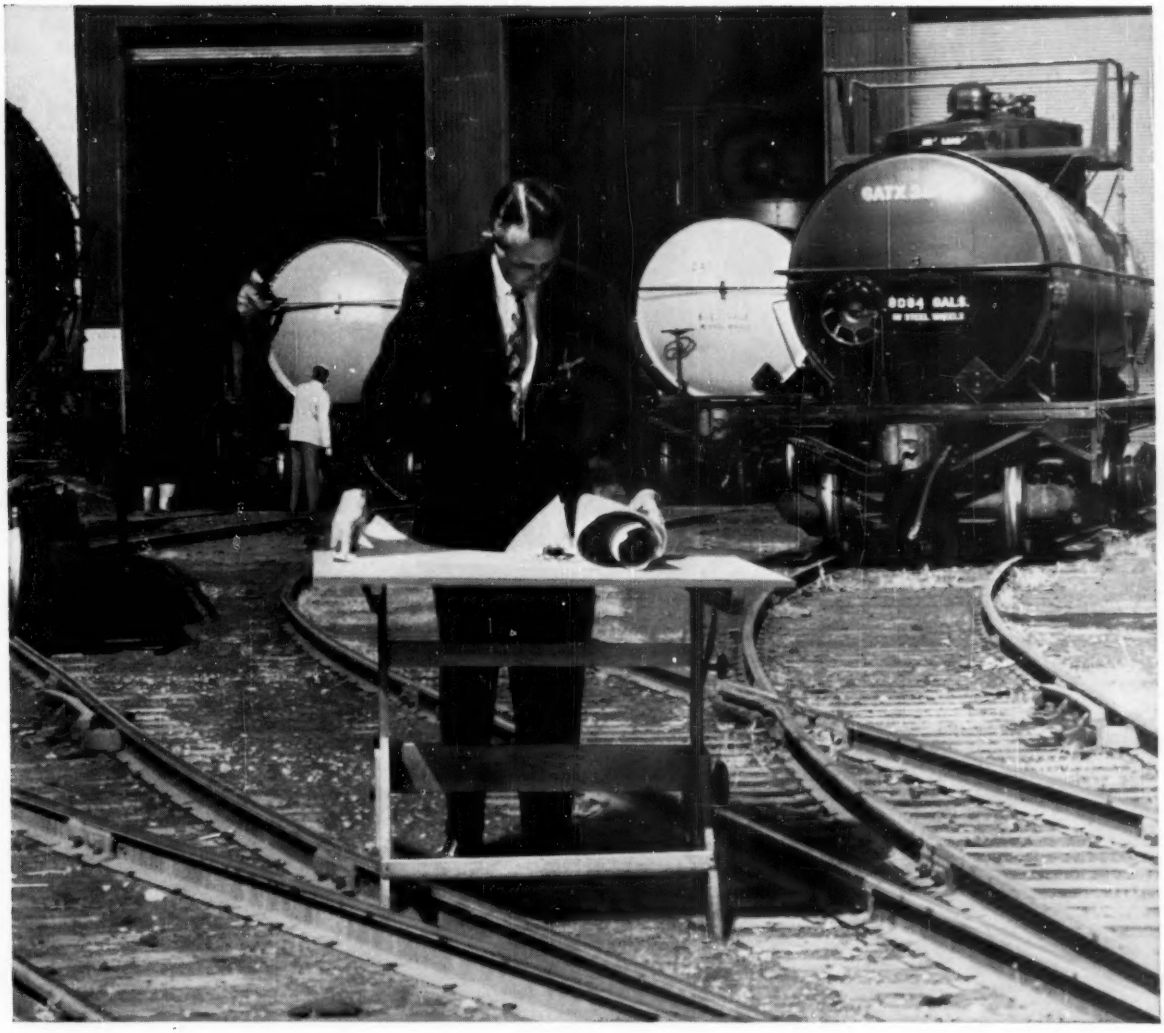
Meet the Author

When this *CW* Report reaches management men's mailboxes, author Karl Falk—snapped here with friend, *CW* Editorial Director Sidney Kirkpatrick—will be in Germany again. This time he travels under State Department auspices to resume the popular lecture series that he began as a Fulbright lecturer in Germany during 1954-55.

Falk, who authored a previous *CW* Report on Germany *(CW, Jan. 15, '55, p. 45)*, studied at the University of Berlin. He has been associated with I. G. Farben and the German Institute for Business Cycle Research prior to a stint as McGraw-Hill Berlin correspondent during 1936-39. In the U.S., he has served as a chemical economist with government agencies.

Home—in Fresno, California—Karl Falk is better known as Dr. Falk, professor of economics, and Social Science Division head at Fresno State College.





What does an engineer do for GATX?

Engineering a special-purpose tank car is a job for experts. Stress, mobility, center of gravity, corrosion resistance—these are a few of the factors to be considered. At General American you'll find engineering specialists—men who pioneered with aluminum tank cars. These made possible bulk shipments of hard-to-handle liquids. You'll find men who developed the first flued-dome tank car, the first all-welded underframes, the first half-oval heater coils—and a long list of additional improvements.

This engineering skill and experience that make such developments possible is part of every GATX lease—a lease that provides shippers with the most dependable service available for bulk liquid transportation. When you lease cars from General American, you avoid the need for capital investment as well as operating, servicing and maintenance problems.

If you'd like additional information concerning the advantages of a GATX lease, call or write your nearby General American District Office.

It Pays to Plan With General American

GENERAL SERVICE CARS | ALUMINUM CARS | PRESSURE CARS | INSULATED CARS

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Service Plants Throughout The Country

NEW KIND OF FEED BAG is this big "pillow tank" of nylon fabric coated with CHEMIGUM. It holds 10,000 gallons of volatile fuel, yet can be carried in a small chest, rolled out like a rug, filled in minutes—anywhere.

"SUB" THAT'S NOW FIRST STRING is this basketball with cover of PLIOFLEX reinforced by PLIOLITE S-6B. It looks, feels, acts like leather, but is much more wear-, water- and scuff-resistant—lower in cost.

How to get the most out of rubber

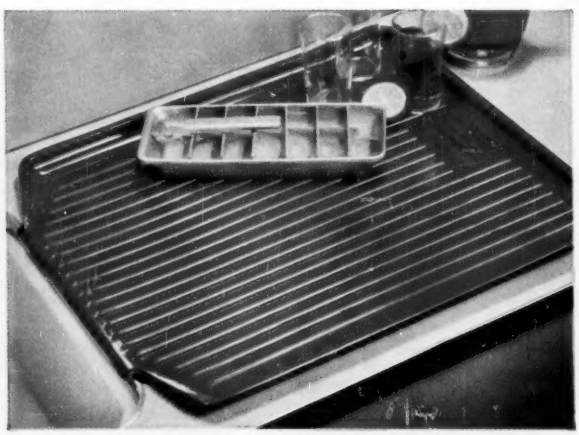
Each of the products pictured here has successfully met the test of today's competitive market. But there's no secret to this success. It stems from the simple fact that their manufacturers availed themselves of the new materials and services offered by the newly formed Rubber & Rubber Chemicals Department of the Goodyear Chemical Division.

The materials offered include two families of general-purpose styrene-butadiene polymers—PLIOFLEX Rubbers and PLIOLITE Rubber Latices. For oil-resistant applications, the CHEMIGUM Rubbers offer a range in both nitrile content and properties. For rubber reinforcement, there's PLIOLITE S-6B, a high-styrene resin. In non-staining antioxidants, WING-STAY S is the first of a line of job-designed rubber chemicals.

"Job-designed" aptly describes all of the materials supplied by the Rubber & Rubber Chemicals Department. As a matter of policy, they all were specifically developed to meet specific needs. And since proper application is essential to their advantageous use, it is also a matter of policy that their sale be accompanied by complete technical service.

Recognition of the need for thorough technical service was the basic reason for establishing the

COLORFUL COASTERS that stay bright and flexible are made of foamed PLIOLITE LATEX protected with WING-STAY S. They keep their "just bought" look and absorbency despite exposure to water, sunlight or repeated washings.



CHEERFUL HELPERS AROUND THE HOME are mats, strainers and other housewares of styrene rubber reinforced with PLIOLITE S-6B. The resin imparts toughness, rigidity and smoothness—adds to wear-, oil- and water-resistance.

ACID TEST IS TAKEN AND PASSED—every day in many ways—by strong, safe, easy-handled hose made of PLIOFLEX reinforced with fabric and, sometimes, steel wire. It's a flexible answer to many materials handling problems.

SOMETHING NEW UNDER THE CHRISTMAS TREE at many oil wells is an oil-resistant shoe sole consisting of CHEMIGUM blended with PLIOFLEX. This blend provides excellent combined wearing and oil-resistant properties at low cost.

in eight different ways

Rubber & Rubber Chemicals Department. Its formation permitted the marshaling of the skills and experience of many technicians, plus the proper physical facilities to help you get the most out of rubber as easily and economically as possible.

Why not learn firsthand how the products and services of the Rubber & Rubber Chemicals Department can put your product in the same class with the eight shown here? It's easily done by writing to: Goodyear, Chemical Division, Dept. R-9417, Akron 16, Ohio.

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& RUBBER
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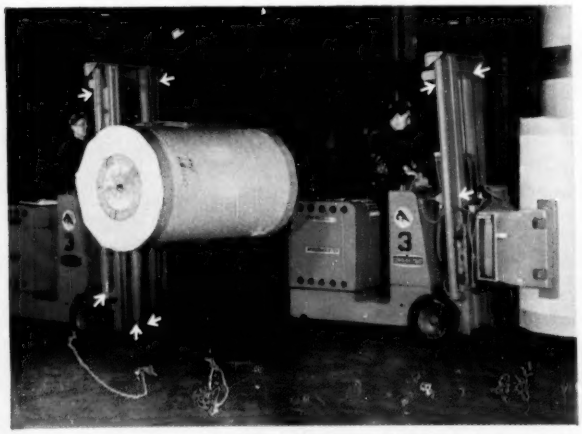

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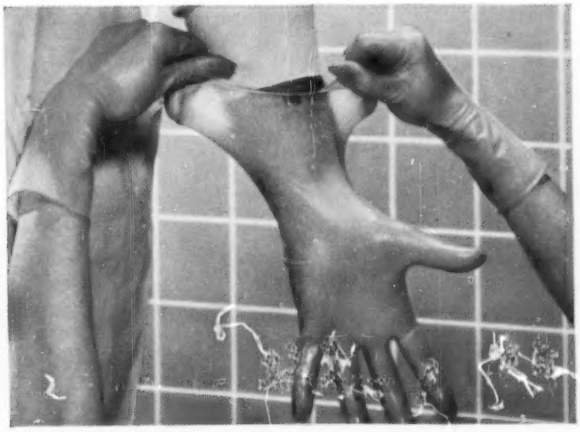
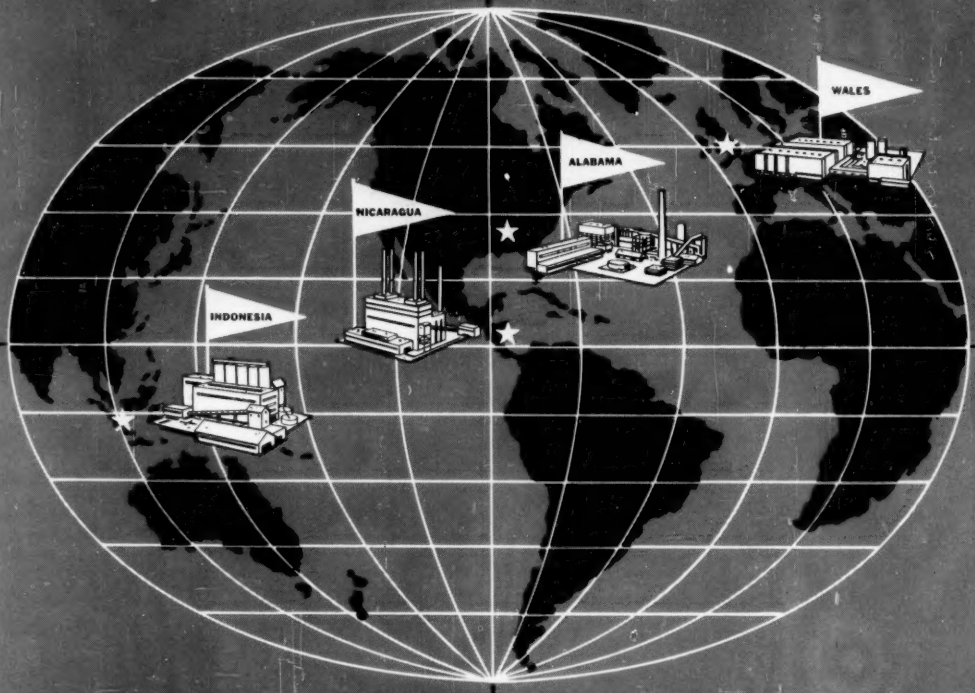


LASTING ELASTICITY, STRENGTH AND SOFTNESS are essential in surgeons' gloves. Heat- and water-resistant WING-STAY S does much to help the natural rubber retain its original properties, despite repeated sterilization.

THERMOELECTRIC PLANT FACILITIES IN NICARAGUA for Empresa Nacional de Luz y Fuerza, Managua. Ferguson is constructing the powerhouse building, intake channel, discharge tunnel, pump house and associated works. Design by The Kuljian Corporation.

PAPER MILL IN ALABAMA for Gulf States Paper Corporation to produce 300 tons of bleached sulphate pulp daily. A continuous cooking process is one feature contributing to the ultimate in paper mill automation. Design, construction and mechanical installation by Ferguson.



CEMENT MILL IN INDONESIA for Gresik Cement Corporation with initial minimum capacity of 250,000 metric tons per year. This joint venture of Ferguson and Morrison-Knudsen includes design, construction and installation of complete plant and auxiliary facilities.

TITANIUM FABRICATION MILL IN WALES for Imperial Chemical Industries Limited, to produce titanium sheet, bar and wire. H. K. Ferguson Company of Great Britain Limited is associated in the design and will manage construction.

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C W Report

fringe benefits, works a 45- to 48-hour week. In the large companies, however, the rate is about 75¢/hour, exclusive of fringe benefits (which may be worth as much at 25¢/ hour). His American counterpart gets somewhat more than $2/hour for a 40-hour week.

German chemical makers use much more labor per unit operation than do their American counterparts. But productivity per American worker is two to three times as high. The U.S. chemical industry has only twice as many workers,† but its sales are seven times as high as those of the German *(see chart, p. 63)*.

Thus, even though it marshals its labor forces, the German chemical industry does not fully offset the American advantage in raw materials and power. German chemical producers figure that they are at a 10% to 15% disadvantage—depending, of course, on the amount of labor involved in a given product—in most world markets. And this general situation, with regard to labor and raw materials, will probably hold true for some time to come.

Nevertheless, German chemical exporters are having little trouble finding markets, particularly in dollar-short countries where West Germany is willing to take raw materials (which the U.S. may not need or want) as payment.

Eye to I. G.

Despite postwar decartelization, there is still a greater degree of concentration in the German chemical industry than in the American. Moreover, the big I.G. Farben combine, splintered by Allied decrees only a few years ago, appears to be coming together again *(CW, March 24, p. 17)*. A complete re-emergence of I.G.

†800,000 chemical workers in the U.S., compared with 400,000 in West Germany. These are 1955 figures. As of March 1956, there were 841,000 chemical workers in the U.S.

5 hour, 250°C. heat test proves you can make lighter color esters with Armour Oleics!

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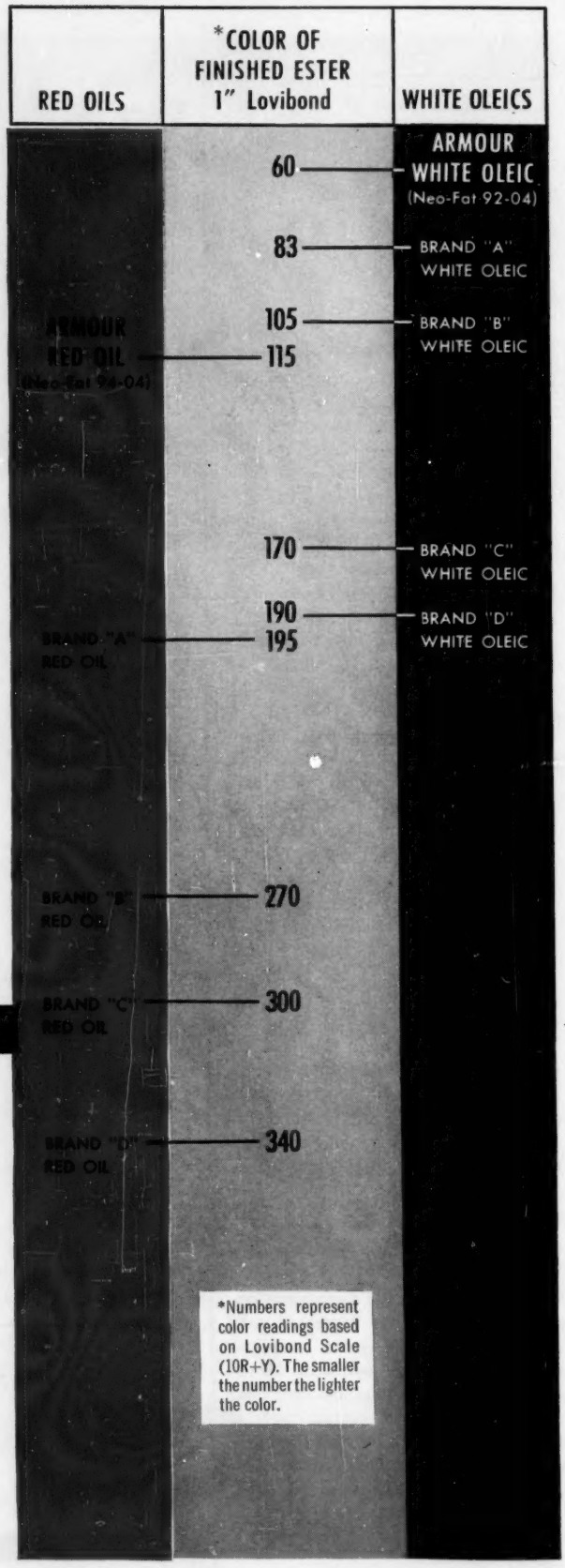

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CW6

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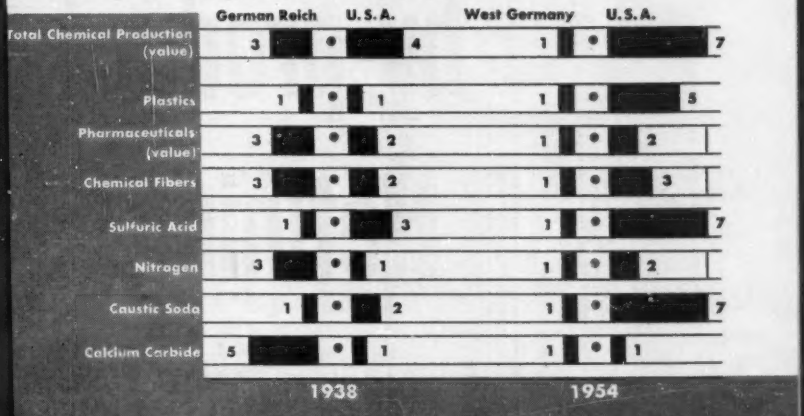
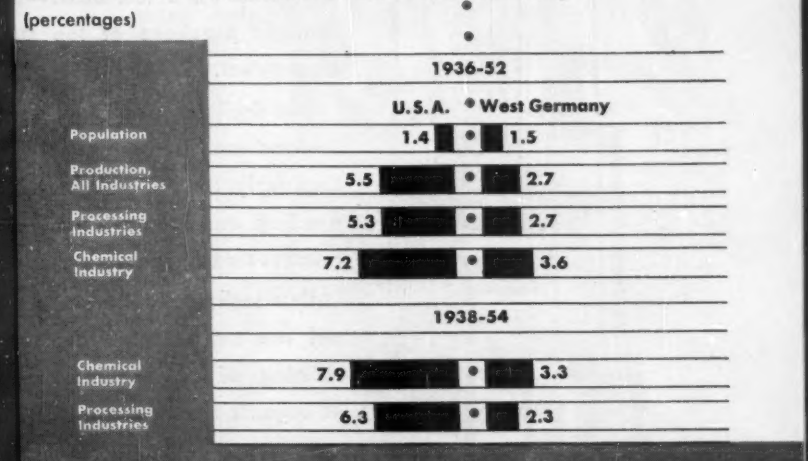
The Changing Balance

Production Ratios for Selected Chemicals
(on a tonnage basis except where otherwise indicated)



WHO'S GROWING FASTER?

Selected Growth Rates in U.S. and West Germany
(percentages)



C.W Report

Farbenindustrie would mean tough sledding for competition, particularly American competition.

As late as 1943, I.G. Farben was the world's largest single chemical company, with an output then roughly double that of Du Pont. Bayer, Farbwerke Hoechst, and Badische Anilin & Soda Fabrik, rank 12th, 13th, and 15th, respectively, or, grouped together, are in fifth place among world chemical leaders.

At present, the three I.G. successors together furnish about 25% of West Germany's total chemical output. By comparison, 15 large American chemical companies supply 25% of total U.S. chemical production (*see chart, p. 52*).

C W Report

These figures, based on sales, are not strictly comparable. German sales figures suffer somewhat, because there is less double-counting in Germany than in the U.S. Here's why.

In the U.S., there is a relatively large amount of trade between chemical companies. The same chemical often figures into two sales: one when the basic producer sells to a processor, and again when the latter sells the finished product. German firms, on the other hand, tend to turn out everything from raw material to finished product in one plant. They count only the sales of the finished product.

Too, Germans classify chemicals somewhat differently.

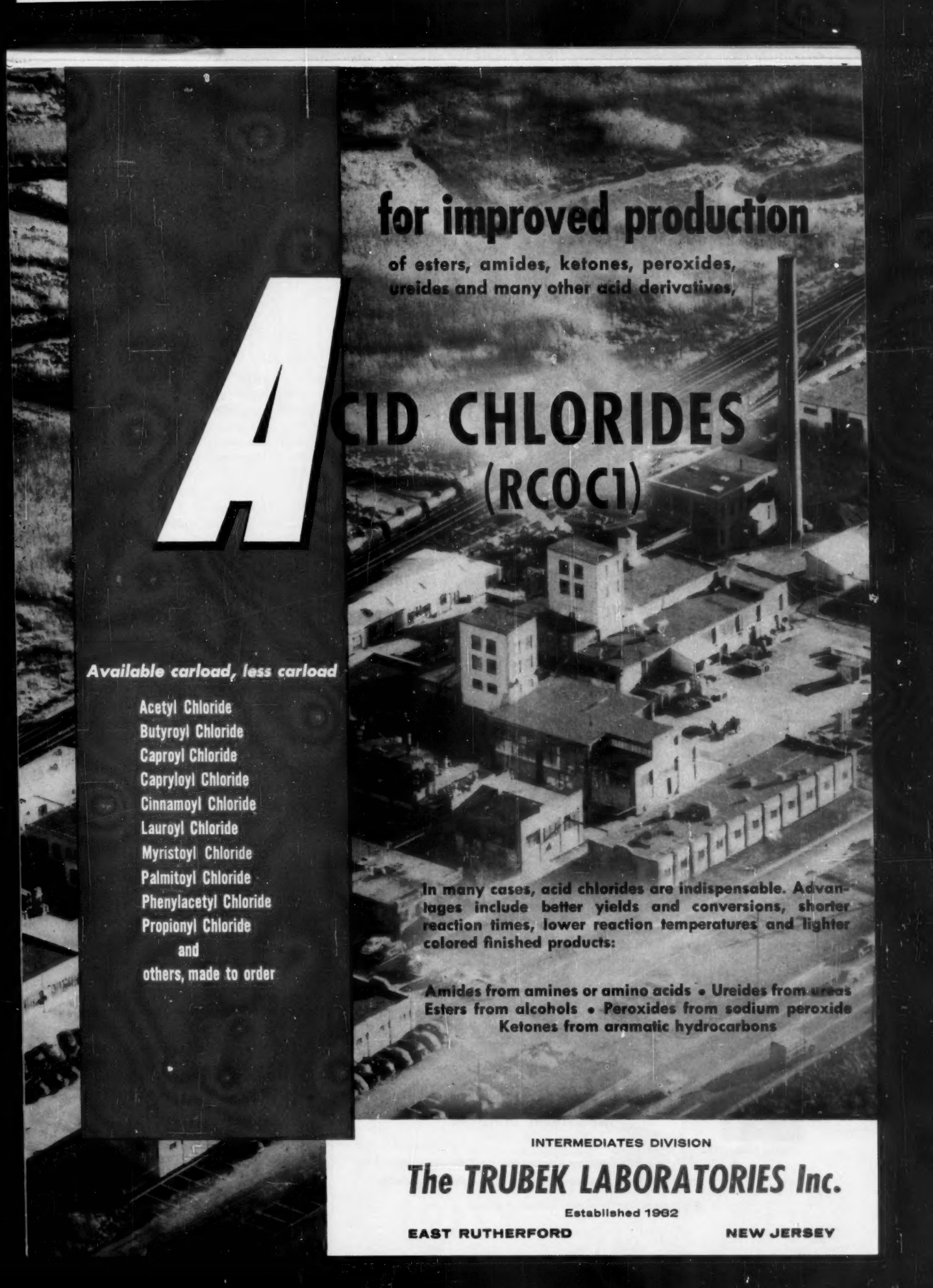
Despite their impressive stature at home, the top three West German firms last year recorded sales that totalled less than half the sales of Du Pont (*see table, p. 53*). And they required 103,000 workers to achieve this output, while Du Pont employed only 90,000.

But the figures indicate that the West German companies are economically healthy and well able to compete in world markets. And, in the event of reintegration of the former I.G. Farben trust, the Germans might regain their pre-World War II advantages in production, research, development and marketing—making them, perhaps, the mightiest force on the world chemical scene.

What's Ahead?

But the chemical processing field has become so large that no one nation can excel in all its branches.

Traditionally, the U.S. and Germany have probably been each other's most vigorous (if not biggest) competitors; but the two countries have also been each other's leading customers for chemicals. This, together with the recent licensing (both ways) of technological know-how and joint ventures (e.g., Mobay Chemical formed jointly by Monsanto and Farbenfabriken



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C W Report

Bayer to make plastics), shows very pointedly that there is much to be gained from cooperation as well as from competition.

In any event, American chemical men can no longer look upon Germany as a beaten, helpless nation. The West German chemical industry is making a big comeback. The necessity of building from scratch after World War II has given West Germany a modern chemical industry geared for competition anyplace in the world.

But as strong as the West German chemical industry may appear, it is still beset by problems, some of them formidable.

Top among these: costly raw materials; political, economic, and social complications, which the division of Germany has brought to all German industry; fast-stepping technologies in the U.S., western Europe, and the U.S.S.R.; more acute competition (especially by U.S. chemical industry) for world markets.

These factors exert a marked restraining influence. But they are by no means crippling.

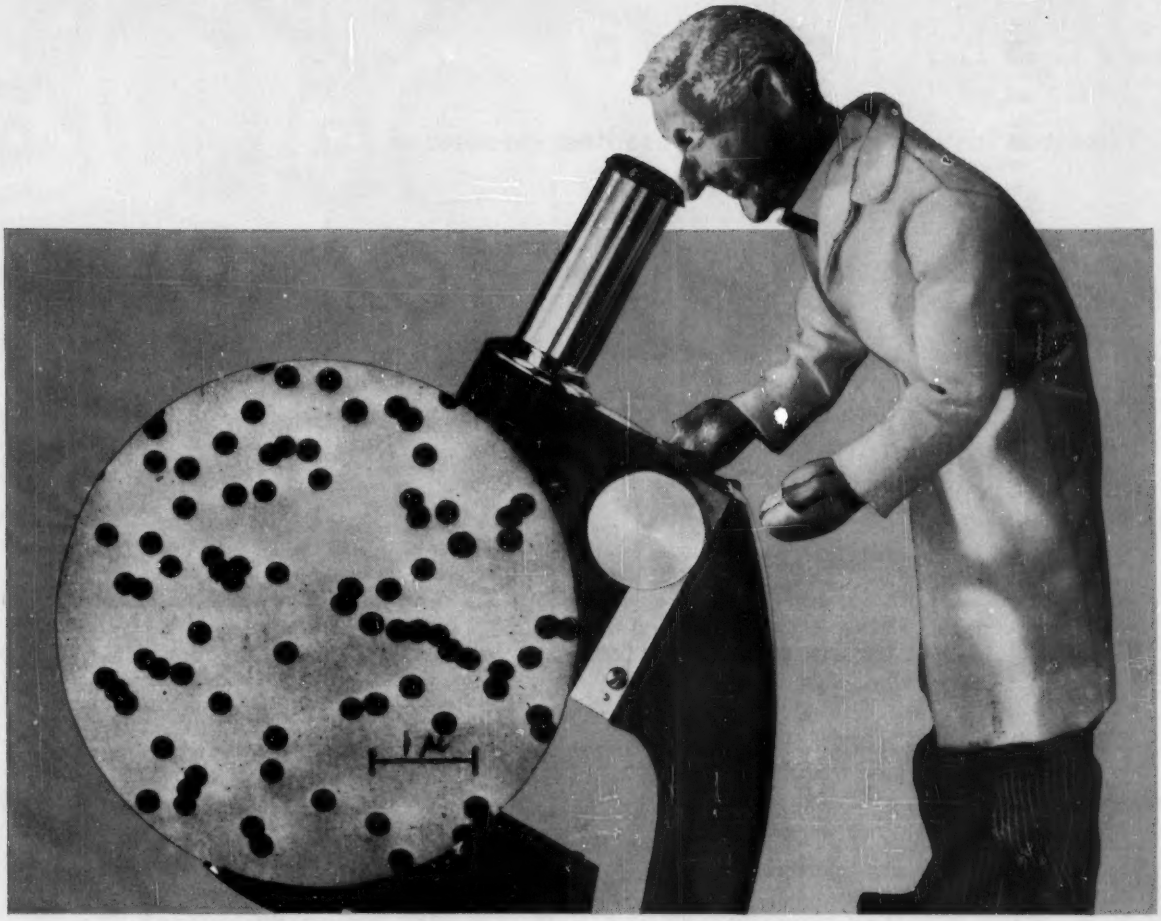
Even more important, the Germans' eagerness to rebuild their industry to its pre-World-War-II eminence has not been destroyed. The competitive spirit is strong.

U.S. chemical industry has an edge over this competition now. Whether or not it can keep the lead remains to be seen.

REPRINTS AVAILABLE

Copies of this report are available from Chemical Week, Reprint Dept., 330 W. 42nd St., New York 36, N. Y., at 50¢ each.

Prices for bulk quantities (over 10 copies) and for previous CW Reports are available upon request.



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These advantages derive from their structure and from the well-defined, highly pure chemical composition that ensures uniformity of performance. The AEROSOL Agents vary considerably in ratio of polar to nonpolar constituents, offering a selection to meet varying requirements of different monomer systems and processing conditions.

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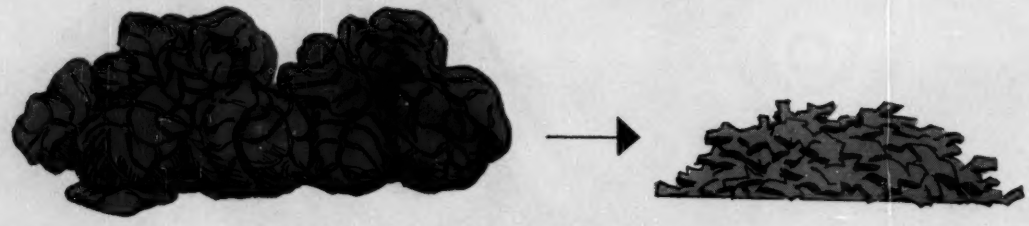
Flavor is lost when vegetables are heat-processed



Flavor returns upon addition of a pinch of enzymes

Big new market for enzymes is promise of studies that show . . .

How to Put the Flavor Back into Food

Just completed research indicates enzymes may be able to restore flavors to irradiated foods, as well as those preserved by less drastic measures.

It's a potential bonanza in terms of enzyme sales (food processing is a $50 billion/year industry). And it may presage a shift in flavor research.

Caution: Studies are still in a fundamental stage—commercial value of the development is not proved.

Food processors' appetites are being whetted this week by a new development in flavor chemistry: Evans Research & Development Corp. (New York), in cooperation with the U.S. Army Quartermaster Research & Development Command (Natick, Mass.), has found that enzymes will chemically reactivate latent flavor precursors. Significance: with enzymes, it may be possible to put the natural flavor back into foods that have been dehydrated, frozen, or canned. More than that, enzymes may prove the answer to the multimillion-dollar question of how to make irradiated foods palatable.

Any new chemical approach to the massive ($50 billion/yr.)* food processing industry is bound to whip up interest among chemical companies. But the enzyme findings are doubly important because, in addition to opening up new areas of research, they may foreshadow a shift in flavor-chemistry studies.

Now, researchers try first to identify flavor components, then simulate them. The use of enzymes may put the emphasis on restoring natural flavors, instead of synthesizing them.

Flavor Theory: Eric Hewitt, Donald Mackay and Kurt Konigsbacher of Evans Research collaborated with Torsten Hasselstrom of the Quartermaster Command in the enzyme work. This is how they explain their theory.

Flavor is due to the chemical compounds produced by normal metabolic processes. These flavors are produced by enzymes (naturally occurring proteinaceous materials) that catalyze changes in other chemical compounds —flavor precursors. (These, in turn, are formed from their own precursors.)

Food deterioration is also brought on by enzymatic action. Certain processes—e.g., heat treatment—manage to preserve food by destroying enzymes that cause spoilage. Unfortunately, as the Evans team sees it, the enzymes that give flavor are also sensitive to heat. So they're destroyed, too. And [illegible] may destroy many of the volatile or heat-labile flavor components, thereby cause an off-flavor in vegetables and other processed foods.

But, if the heat treatment isn't too severe, flavor precursors may survive. Then, by adding the proper enzymes, flavor can be restored.

The difficulty is that the flavor-producing enzymes are highly specific, and there's now no commercial source for those needed. The required products must be derived from foods related to the food to be treated, and they should be capable of production by regular enzyme processing techniques (e.g., solvent extraction from crushed source material).

No Side Effects: Enzymes tried so far have had no harmful side effects, can be added to the food at any stage of processing after the last extreme-temperature exposure. Only minute quantities of enzymes are necessary. Evans' Hewitt says that a concentration of over 1% would be high.

*Includes all processed foods at manufacturers' sales level. Source: U. S. Department of Commerce.

STEPAN AMIDES

LIPA

A 100% active, fatty acid alkylolamide, nonionic in character. It is a light ivory color, waxy solid, with a mild, pleasant odor. LIPA is a superb foam stabilizer and also a good auxiliary detergent when used with fatty alcohol sulfates and/or alkyl aryl sulfonates. It is recommended for use in heavy duty laundry detergents, creme shampoos, rug shampoos and detergent hand cleaners.

LDA

A special 100% active fatty acid alkylolamide (a diethanolamide condensate with a very pure grade lauric acid). It is nonionic in character. LDA is a splendid foam stabilizer for liquid dishwashing detergents. It is also an excellent wetting, foaming and thickening agent as well as a good detergent and emulsifier. Recommended too, for shampoos, hand cleaners, and for use in hard surface cleaners.

T6-A T6-B

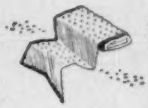
Both products are alkanolamides, 100% active and nonionic in character. T6-A is recommended for use in bubble bath preparations for its fine foam stabilizing in the presence of soap. T6-B is recommended for use in clear and lotion type shampoos as a good thickening agent and auxiliary detergent with some emollient action.

HDA-7

A heavy duty alkanolamide with a built-in coupling agent which permits a very high phosphate tolerance (as much as 11% on an anhydrous basis). Here is the product to investigate if you are looking for a heavy duty all-purpose hard surface cleaner with a lot of punch. Does an excellent job of wax stripping without harmful effect on floor.

ADT

A low sudsing, special, 100% active fatty acid alkanolamide. It is nonionic in character. ADT is highly recommended for use in formulating liquid scrub soaps. Among its advantages, it can eliminate the use of a coupling agent, has high viscosity and performs unusually well in hard water.



S-86

A 100% active alkanolamide. Essentially nonionic in character with good alkaline stability. Specially recommended for use in textile scouring, dye leveling and similar applications. S-86 provides good detergency for both cotton and wool. S-86, in addition, also offers some advantages for use as a stabilizer and thickener.

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FLAVOR TASK FORCE*: For troops, cabbage that tastes like new.

HEWITT (left) and HASSELSTROM: For chemists, a new line on flavor.

It's still too early to say much about the commercial prospects of the work. But Hewitt points out that the required enzymes don't have to be extremely pure. But by the same token, care must be taken to keep out any enzymes that might produce off-flavors. Therefore, he sees two possible roads to commercialization:

- Enzymes that aren't too costly to purify will be sold directly to food processors who can add them during a regular processing run.
- Enzymes that are difficult or costly to separate will be concentrated and sold as seasoning—even though some undesirable ones may be present. The enzymes would be sprinkled on just before the food is served: the flavor-producing enzymes (present in high concentration) thus would act before the others.

Just where Evans fits into the commercialization picture is hard to say. Normal procedure on a joint government-company research contract dictates that inventions or products arising from the work be available, without cost, to the government. Any commercial benefits accrue to the private firm.

Evans Research is a commercial research laboratory. But it's possible that its affiliate, Evans Chemetics, which makes organic compounds and cosmetic products, might enter the enzyme-producing business. Right now, though, this is mere speculation.

Cabbage Test: The joint research effort began in 1952, when the group aimed to make dehydrated cabbage more palatable to armed forces personnel. Because of its nutritional value, cabbage was desired by dieticians for field rations. But the dehydrated material lacked flavor. In this initial work, the natural flavor of cabbage was restored to the dehydrated vegetable by treating it with water and enzymes prepared from mustard seeds.

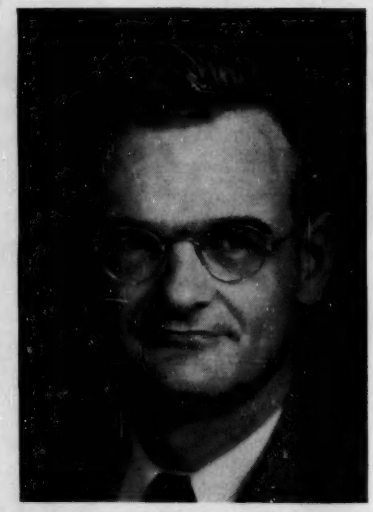
But while the team has stressed cabbage and watercress in their studies, they're sure the process is applicable to any food that undergoes flavor changes during processing. They've also experimented with and improved the flavor of other vegetables (e. g., peas, spinach, tomatoes), fruits (e.g., bananas, strawberries), and milk.

Brand - New: Based on patent searches and talks with industry people, Evans says that no one (to its knowledge) has done this type of work before. Beech-Nut Packing Co. (Canajoharie, N.Y.), Campbell Soup (Camden, N.J.), General Foods (White Plains, N.Y.), H. J. Heinz (Pittsburgh, Pa.) believe the development is new and interesting, worthy of future research on their part.

Enzyme producers express mixed reactions. "We don't make them," says Takamine Laboratories (Clifton, N.J.), "but we'll start some research now." Wallerstein Co. (New York) reports: "It's just too early to evaluate the impact of this."

Evans, meanwhile, is feeling its way, expects it will take a few years to work out the details. Nevertheless, the firm is confident its findings will add a profitable fillip to flavor chemistry.

*(Left to right): Evans' Konigsbacher, Mackay, Hewitt; seated: U.S. Army Quartermaster's Hasselstrom.



WESTINGHOUSE'S ZENER: For new magnets, a highly coercive force.

Chemical Lodestone

This week, the Air Force's Air Research and Development Command is zeroing in on uses for a new, permanently magnetic material—highly purified manganese-bismuth in powdered form. Developed by Westinghouse Electric Corp. (Pittsburgh) under acting research director Clarence Zener, the compound reportedly features 10 times the resistance to demagnetization of most of its commercial rivals.

This resistance, coming from a property called "highly coercive force," keeps manganese-bismuth magnets from being adversely affected by external magnetic fields, suggests their use in electrical meters where stray magnetism from large electrical equipment is likely to be encountered. And the find may make possible an assortment of permanent magnets of unusual shape, e.g., thin wafers or discs.

Right now, the technique of preparing and utilizing such permanent magnets is under study at Westinghouse materials engineering department under contract with ARDC's Wright Air Development Center (Dayton, Ohio). Although these magnets have been predicted for years, they are possible only because of Zener's new method of preparing highly purified manganese-bismuth in powder form.

To get the super-pure product, manganese and bismuth are ground

together to extremely small particle size under helium gas. This inert atmosphere prevents spontaneous combustion of the mixture. Sealed in a glass vessel under low-pressure helium, the mixture is heated to just under 520 F—the melting point of bismuth. Chemical union results in a product that is virtually 100% pure manganese-bismuth. Reground to a fine powder, imbedded in a plastic matrix, oriented in a powerful magnetic field and molded to shape, the compound forms a permanent magnet.

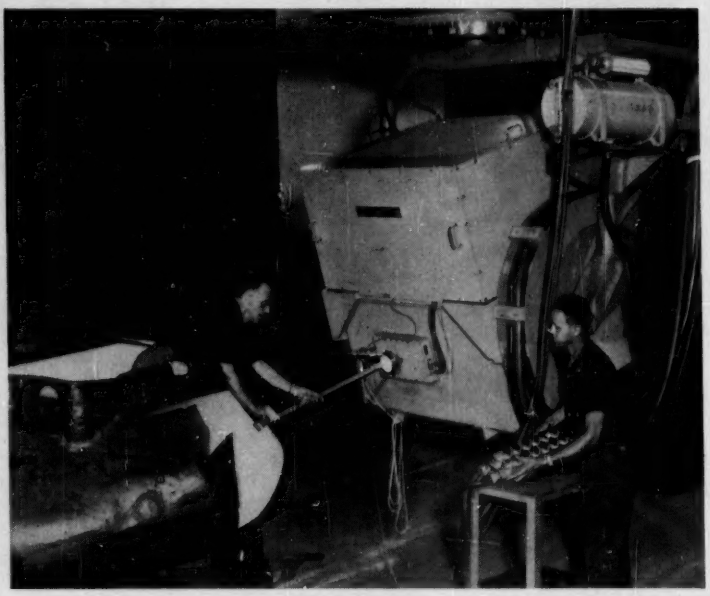
•

These new government chemical research reports are available from the Office of Technical Service, U.S. Commerce Dept., Washington 25, D. C.

• "Cutaneous Toxicity Evaluation of Fabrics Impregnated with Antimildew Agents" (PB 111800, 75¢). Of the agents tested, halogen substituted dinitrobenzenes produced most irritation on human subjects, are not recommended for use in fabrics that would contact the skin.

• "Organometallic and Organometalloidal High-Temperature Lubricants and Related Materials (PB 111889, $3.50) summarizes a year's research.

• "Alkyd Resins for Vinyl Finishes, Part II—Atmospheric Resistance" (PB 111824, 50¢) establishes the type of alkyd resin that gives the best performance when used in combination with vinyl resin as topside coatings for Navy ships.



Assist from the Army

AFTER MORE THAN A YEAR of negotiations, the Army is letting Wayne University's college of medicine (Detroit) use its 15 million volt betatron (right) for cancer research. Installed at the Detroit arsenal, the device—along with other related radiation equipment—has been used to detect flaws in castings and armor plate. It's the first time the Army has extended such a privilege to a civilian agency.

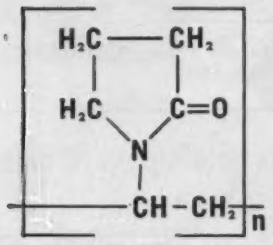
Up to now, universities and similar nonprofit institutions have been allowed to use government-owned scientific equipment only when the latter is already installed in their own laboratories — e.g., Massachusetts Institute of Technology and the University of Chicago use a government-owned digital computer and cyclotron (on their respective campuses) for nongovernment work when there's time available.

PVP is already in wide use in the cosmetic and drug industries. Now there are four more industries in which PVP is being used: Detergents, Lithography, Paints, Waxes and Polishes.

from GAF . . .
an unique polymer with many uses

PVP

(polyvinylpyrrolidone)



DETERGENTS prevents soil redeposition: Especially effective on synthetic fabrics as well as cotton.

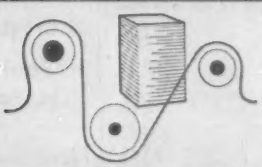
controls color bleeding: PVP complexes with many migrant dyes and pigments to reduce or prevent color transfer during laundering.

reduces irritation: PVP can reduce the "irritating" effect of harsh detergents.

LITHOGRAPHY ink formulation: PVP gives better pigment dispersion and leveling. Imparts enamel-like gloss to heat-set inks. PVP enables the compounding of inks for printing on plastic films.

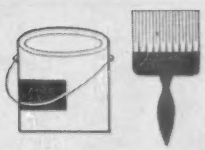
etching: PVP is a preferred colloid for diazo light sensitizers in deep-etched plates. Performs excellently as a post-etch.

fountain solution: PVP in the fountain solution on presses helps keep cloth rollers clean.



PAINTS improves pigment dispersion and film leveling: PVP can reduce pigment particle size during grinding and can prevent flocculation to effect greater tinctorial and hiding power.

compounding of new paints: PVP's affinity and "binding" properties for many types of dyes suggest that paints containing PVP will allow the use of dyestuffs to obtain new colors and shades.



WAXES AND POLISHES improves luster and cleansing action: Formulations containing PVP show improved luster, cleansing action, flow and wetting characteristics. PVP in oil polishes helps sustain luster. In auto polishes, PVP aids in removal of oxidized pigment and improves luster.

For technical information, price schedules and samples write to:

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From Research to Reality

This new partial oxidation process for making synthesis gas...

Starting material	Who's Using It and Where	Process Name	Capacity (cu. ft.* per day)
COAL	Olin Mathieson Chemical Corp., Morgantown, W. Va.	Texaco-Texas	5,840,000

Is joining these older processes...

NATURAL GAS	Spencer Chemical Co., Vicksburg, Miss.	Texaco-Hydrocarbon Research	15,330,000
	Deere & Co., Pryor, Okla.	Texaco-Hydrocarbon Research	13,140,000
	Grace Chemical Co., Memphis, Tenn.	Texaco-Hydrocarbon Research	18,250,000
	Cooperative Farm Chemicals Assn., Lawrence, Kans.	Texaco-Hydrocarbon Research	13,140,000
	Rohm & Haas,† Deer Park, Tex.	Texaco-Hydrocarbon Research	
NATURAL GAS or FUEL OIL	Mississippi River Fuel Corp., Crystal City, Mo.	Texaco-Hydrocarbon Research	14,600,000
	St. Paul Ammonia Products,† St. Paul, Minn.	Texaco-Hydrocarbon Research	14,600,000
FUEL OIL	Northern Chemical Industries, Searsport, Me.	Texaco-Hydrocarbon Research	9,125,000
COAL	E. I. du Pont de Nemours & Co., Belle, W. Va.	Babcock & Wilcox-Bureau of Mines-Du Pont	25,000,000

†Contracted for, but still not built.

*Estimated—actual figure will depend on operating conditions.

As Coal Bids for a Chemical Comeback

When synthesis gas producers started making hydrogen and carbon monoxide by partial oxidation of natural gas and oil instead of by classical coking methods, coal appeared to be on its way out. But with the startup last fortnight* of Texaco Development's coal-consuming partial oxidation process at Olin Mathieson's Morgantown, W. Va., ammonia plant (*CW Technology Newsletter, June 2*), coal is bidding to regain lost ground.

*However, the plant will not be in production of synthesis gas until August.

Success of the Morgantown experiment will not only be a big boost for coal as a chemical raw material—it will also afford synthesis gas users a wider choice of sites on which to locate ammonia, methanol and Fischer-Tropsch plants. The addition of practically all grades of coal to the list of suitable raw materials would bring such plants close to their markets in those areas where cheap natural gas and oil are not available.

And coal's proponents aren't hanging all their hopes on this one process; they expect to have at least two, possibly three, coal-consuming methods ready to take over from the coke process.

First in Line: One of the first com-

At last...the solution to

really tough

gas-cleaning problems

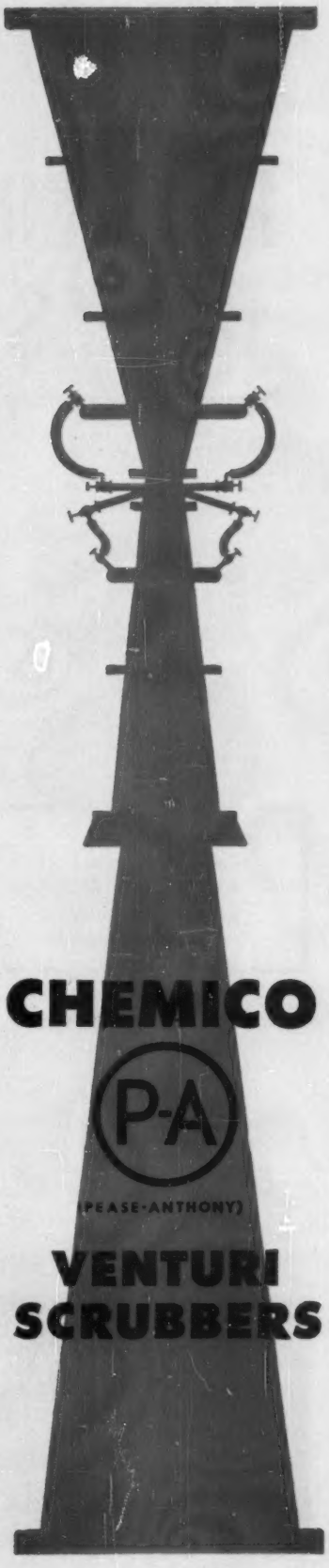
Sub-micron fumes are the **really tough** gas cleaning problems. These fumes cannot be economically or effectively controlled by conventional cleaning devices.

However, the Chemico P-A Venturi Scrubber is proving its success in solving these **really tough** problems in more than 150 commercial installations and in more than 70 pilot investigations.

The table lists some of these commercial installations. All of these **really tough** problems and many more are being solved with complete satisfaction to users of P-A Venturi Scrubbers.

PROCESS	DUST OR FUME	INSTALLED CAPACITY CFM
Incinerator—Flue Fed	Fly Ash	32,000
Incinerator—Sodium Disposal	Na_2O	9,000
Incinerator—Industrial	Radioactive Dust	6,000
Dry Ice & CO_2 Plants	Amine Recovery	72,400
CO_2 Gas for Process	Fly Ash	500
Boiler Flue Gas	Fly Ash & SO_2	4,300
Enamel Frit Furnace	Dust & HF	11,900
H_2SO_4 Concentrator	H_2SO_4	49,800
Copperas Roasting	H_2SO_4	34,250
Cobalt Ore Roasting	H_2SO_4	65,000
Chemico Wet Type Acid Plant	H_2SO_4	41,000
Chloro-Sulfonic Plant	H_2SO_4	600
Phosphoric Acid Plant	H_3PO_4	91,900
Phosphoric Acid Concentrator	H_3PO_4	194,000
Phosphor Copper Furnace	H_3PO_4	15,000
Smelting—Non-Ferrous		
Blast Furnace	Lead & Organic	12,000
Reverb. Furnace	Lead Compounds	23,500
Comb. Blast & Reverb.	Lead Compounds	7,000
Brass Furnace	Zinc Oxide	7,500
Ajax Furnace	Beryllium Fumes	4,000
Steel Plant		
Oxygen Steel Process	Iron Oxide	140,000
Blast Furnace	Coke & Iron Oxides	788,000
Zinc Sintering	Zinc Oxide	75,000
Wood Distillation	Tar Products	3,500
Na_2SiF_6 Dryer	SiF_4 & Dusts	700
Iron Chloride Concentrator	$FeCl_2$ & HCL Mist	40,000
Unknown	Carbon Black	1,700
Lime Kiln	Lime & Na_2O	18,000
Detergent Spray Dryer	Chemical Fume	250,000
Furfural Residue Burner	Fly Ash	36,000
Nodulizing Kiln	Manganese & Lead	25,000
Aluminum Pot Lines	Tar Fog, Fluorides	40,000
Carbide Furnace	Metal Oxides	1,000
Asphalt Plant	Rock Dust	80,000

Write to our P-A Sales Department for Bulletin M-102 describing the simple operating principle of the P-A Venturi Scrubber, and Bulletin M-103 explaining its metallurgical fume applications in the steel industry.



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mercially feasible units for the partial oxidation of coal was the 25-million-cu.-ft./day unit of DuPont's Belle, W. Va., plant. Based on a process developed and piloted by the Bureau of Mines at Morgantown, the plant was designed and built for DuPont by Babcock & Wilcox. Onstream since early '54, the plant has operated satisfactorily, despite its experimental ups and downs. But DuPont is still weighing the evidence, plans no expansion.

Another synthesis gas-from-coal process is being readied by Hydrocarbon Research, Inc. (New York)—joint developer with The Texas Co. of the widely used oil and natural gas partial oxidation processes. Working with The Philadelphia and Reading Coal and Iron Co. and other anthracite producers, HRI is working on a method (now in the pilot stage) that will operate with either anthracite or bituminous coal. Koppers, too, is working on a method of gasifying pulverized coal.

Coke Strikes Out: Before the advent of partial oxidation, synthesis gas was traditionally generated from coke, steam and air by the water-gas method of "blows" and "runs." But the process had two strikes against it from the start: (1) plant location was limited to areas in which low-cost coking-grade coal was plentiful; (2) it operated at atmospheric pressure, required compression of the product gas for high-pressure syntheses or hydrogenation. Strike three came later with the development of feasible processes utilizing cheap natural gas.

First process to take the play away from coke was steam-methane reforming of natural gas. Later, European companies began investigating partial oxidation processes as a means of reducing the high heat input required for the catalytic steam-methane method. Though these attempts were generally unsuccessful, Montecatini, at least, came up with a commercial process for the partial oxidation of methane. Montecatini has built several units to operate on methane from coke oven gas, and in 1953, adapted the system to use fuel oil at a Japanese installation.

In this country, development of a workable partial oxidation process was spearheaded by Texaco-Hydrocarbon Research. In this method, hydrocarbon feed (natural gas or fuel oil) and oxygen are preheated and fed separately to burners at the top of an unobstructed, refractory-lined vessel. The gas-generating reaction takes place at temperatures above 2,000 F, at pressures around 350 psi.

The first commercial production of synthesis gas from natural gas went onstream at Spencer Chemical Co. (Vicksburg, Miss.) in 1954. Today there are a half dozen licensees operating or building partial oxidation plants to use natural gas (*see box, p. 78*). And if Northern Chemical Industries (Searsport, Me.) starts up on schedule, the first synthesis gas-from-fuel oil plant will go onstream this summer.

With burner changes, addition of oil storage, and other minor modifications, any natural gas plant could operate on fuel oil. And the process is sufficiently versatile to utilize almost any grade of oil—or even tars if they're pumpable when hot. One or two plants have been designed to use either starting material, will consume fuel oil during the heating season when natural gas demand is at its peak. Mississippi River Fuel Corp. at Crystal City, Mo., first plant designed to use either natural gas or oil, has so far operated only on the former.

Similar Operation: Except for equipment modifications to permit the use of pulverized fuel, partial-oxidation-of-coal processes are similar, in other respects, to natural gas and oil-consuming operations. But there's considerable variation in the operating conditions maintained in the coal-burning systems.

Olin Mathieson's new Texaco unit, for example, probably operates at between 400-500 psi. This high pressure, says Texaco, obviates some of compression stages ordinarily required for subsequent ammonia synthesis, other hydrogenation processes. Too, it permits the use of smaller equipment components, simplifies gas purification (carbon dioxide is easily scrubbed out with water at high pressure).

DuPont's unit, on the other hand, operates at atmospheric pressure. Though it's difficult to make a direct comparison of the two systems (Du Pont's is a 25-million-cu.-ft./day generator; OM's only 5-6-million), Du Pont believes it's still debatable whether small pressure vessels are cheaper than larger, nonpressure vessels. Taking the middle road, HRI states that its partial oxidation process

will operate at intermediate pressures.

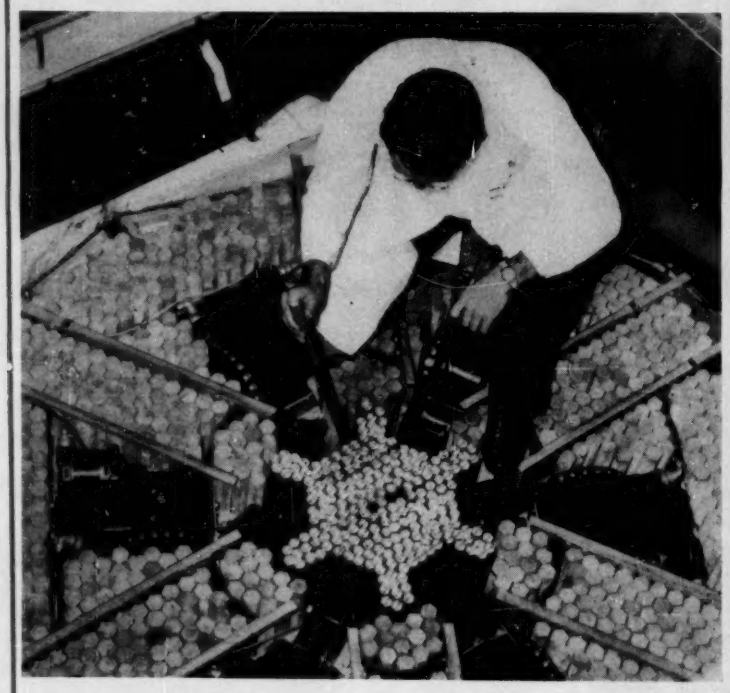
Operating Economy: Fuel costs for the various partial oxidation processes will depend largely on availability of raw materials. But even in those locations where coal holds the edge, it's generally conceded that the coal-consuming synthesis gas generators will require more oxygen than natural gas or fuel oil plants. Both DuPont's and OM's units will probably consume close to 330-340 cu. ft. of oxygen per 1,000 cu. ft. of synthesis gas. That's about 30% more oxygen than natural gas and oil plants require.

Even so, partial oxidation of coal could be the answer to fuel supply problems in many coal-rich areas. In Korea, for example, a fertilizer plant now being built will have to import all of the fuel oil for its Texaco-HRI synthesis gas generator. At the same time, the plant will be firing its boilers with coal that's in plentiful local supply.

Production costs of synthesis gas may be compared by a comparison of ammonia* costs: $30-$37.50/ton from natural gas or oil; $46/ton ammonia from coke. While comparable figures for partial-oxidation-of-coal processes are not yet available, they will probably fall between these limits.

Until the final results are in, DuPont, Olin Mathieson and Hydrocarbon Research can be sure that the rest of the chemical industry will be carefully watching and comparing the progress of all three processes.

*Cheapest source of hydrogen for ammonia synthesis plants is reformer off-gas, other by-product supplies.



Bundles Breed Fast Atoms

WHAT MAKES an atomic reactor tick? That's a question that many people outside the security-shrouded inner circle of atomic technologists often ask. One answer was shown to visitors to the tenth anniversary "open house" of Britain's Atomic Energy Research Establishment at Harwell, Berkshire, when ZEUS (Zero Energy Uranium System) bared its heart of enriched uranium core rods *(above)*. Producing more fissionable material than it consumes, ZEUS is a prototype of the fast reactor being built at Dounreay, Scotland.

Nuclear Posers

Chemical manufacturers, who have been eagerly awaiting the arrival of peaceful atoms for industry, last week got sobering news. It came in the form of a bulky report on the effects of atomic radiation—the result of a year-long study by the National Academy of Sciences.

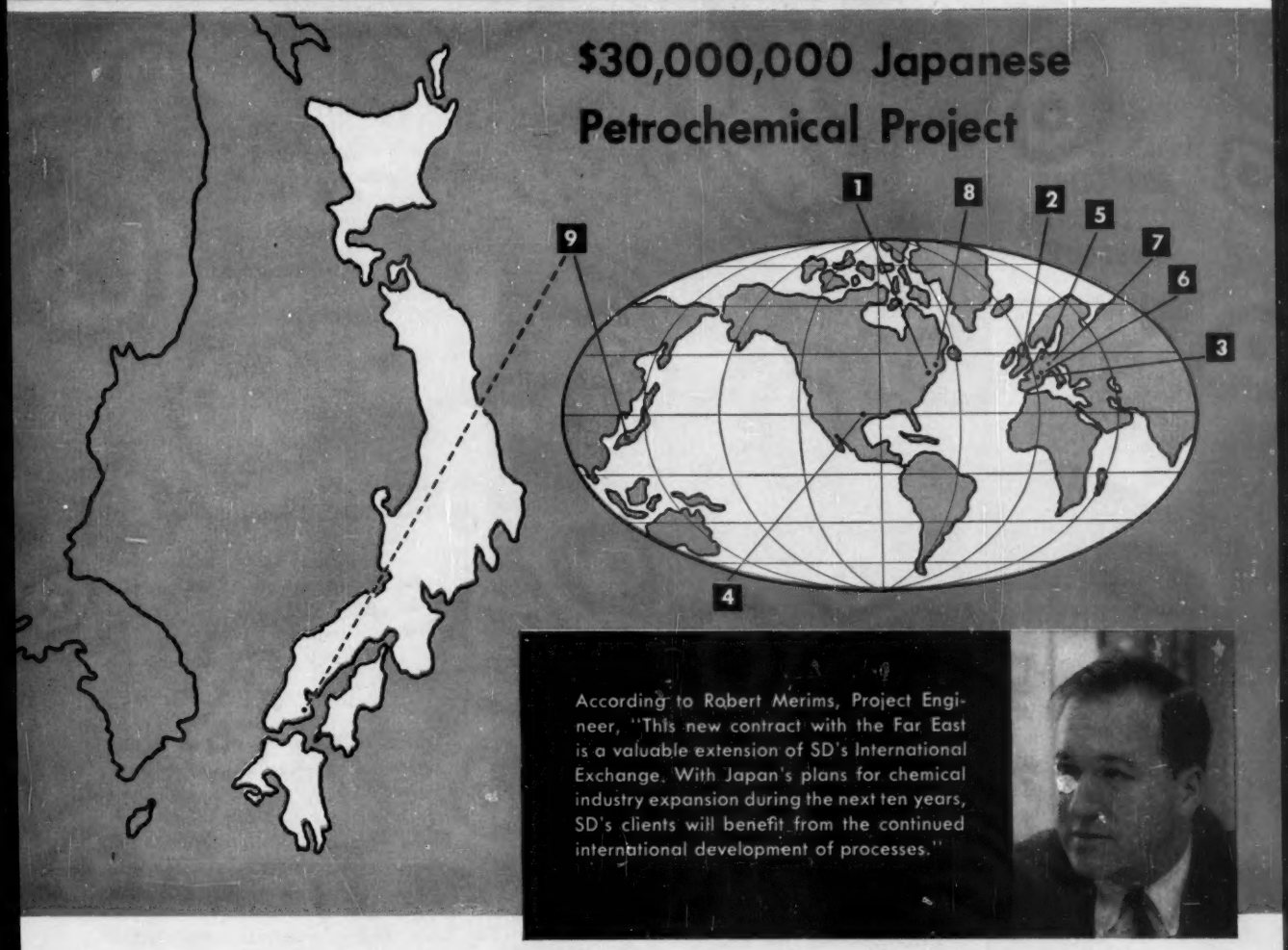
Findings of greatest concern to chemical processors:

- Wet-processing industries, pharmaceutical manufacturers and food processors—dependent as they are on uncontaminated water supplies—will feel "profound effects" from the presence in air and water of large quantities of radioactive wastes discharged by atomic power plants and other users. Many industries—e.g., photographic film manufacturers—are likely to be harmed by even trace amounts of radioactivity.
- Unpredictable, uncontrollable vagaries of the weather make it just about impossible to pick a plant site that is free of the risk of airborne contamination.
- Safe, economic disposal of radioactive wastes is an ever-growing problem. Estimated future production of fission products: 20 lbs./day by 1965; 200-million lbs./day by 1980; 2.4-billion lbs./day by 2000. Containment of the wastes is only an interim solution, warns the report, will soon present an unparalleled problem in storage.
- Few workers at existing atomic plants stand a risk of receiving more than the permissible amount of radiation set by AEC standards—and even those who do are well within the cumulative dose considered tolerable. But employers will have to exercise a great deal of good sense and tact in selecting workers whose duties may expose them to levels of radioactivity that are potentially dangerous.

Reason: a level of radioactivity that would cause injury after prolonged (several decades) exposure would be less of a threat to a worker in his sixties than to a young man. But explaining this could pose a delicate problem.

Though the difficulties that lie ahead appear formidable, the investigating scientists were confident that technological know-how—alerted to these problems in advance—will eventually come up with the needed answers.

NEW DEVELOPMENTS



SD Has Complete Process Responsibility For Ethylene Oxide, Glycol and Cumene

In a move to regain Japan's markets in Southeast Asia, Mitsui Petrochemical Industries, Ltd., will build Japan's first major petrochemical project. Financed entirely by Japanese capital, this $30,000,000 facility will be comparable in size of investment to the largest petrochemical plants in continental Europe —among them in turn some SD clients.

Three key units in the first phase of this project, scheduled for completion in November, 1957, will utilize SD processes for these basic chemicals. Ethylene Oxide by direct air oxidation of ethylene; Cumene by alkylation of benzene with propylene; Ethylene Glycol by hydration of ethylene oxide. In addition to designing and engineering these processes, SD will also oversee construction and supervise initial operation.

The second phase of the Mitsui project, now in the planning stage, will produce dimethyl terephthalate and other chemical intermediates. A major part of this production will be used for the manufacture of synthetic textile fibres.

This is another example of how SD's "International Exchange" works. The ethylene oxide process, for instance, started in SD's American Laboratories (1); was developed in an English pilot plant (2); went on stream for the first time for Naphtachimie in France (3); shortly after was used in an American plant (4); another for Societé Chimique des Derives du Petrole in Belgium (5); an expansion of Naphtachimie (6); another European plant not yet publicly announced (7); the General Aniline and Film plant in Linden, New Jersey (8); and now across the Pacific to Japan (9).

With this project SD's cumene process takes its first trip abroad. In this country the Barrett Division of Allied Chemical & Dye Corp. is now producing cumene in its SD-engineered plant. Mitsui chose the SD process because it produces purer cumene than any other known process. And the plant may be adapted to production of other alkylates, such as ethyl benzene and diisopropyl benzenes.

Perhaps you can benefit from this worldwide experience in organic chemical plant design. Whether your project involves new plant construction, revamping existing facilities, developing a new process, acquiring an existing process or engineering one of your own, you will profit by SD's confidential service.

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EQUIPMENT

Gage-Glass Cleaner: Jerguson Gage & Valve Co. (Somerville, Mass.) has introduced a new rod for cleaning the inside of liquid-level gage glasses. A tubular swab, slipped over a piece of spring steel on the end of the rod, may be tightened against the glass by increasing of the spring arc.

•

Multistream Analyzer: Consolidated Electrodynamics Corp. (Pasadena, Calif.) has modified its Process-Monitor Mass Spectrometer to permit automatic multistream and multicomponent analysis of up to eight process streams (and one standard sample). Previous CEC models handled up to six materials (*CW, May 19, p. 138*). The new unit consists of standard Type 21-620 P-M- Mass Spectrometer, an automatic programmer, a peak selector, piping and valves. Programmer automatically samples each stream and standard sample in sequence, or allows any number of streams to be cut out of cycle. It also operates manually.

•

Flow Indicator: A compact, digital flow-indicator system, packaged as one instrument that can be moved from one test area to another, is now offered by the Berkeley division of Beckman Instruments, Inc. (Richmond, Calif.). Direct flow-rate indication runs from 0 to 9999 lbs., or gals., per hour. The time base may be selected from 1 millisecond to 10 seconds in 1-millisecond increments.

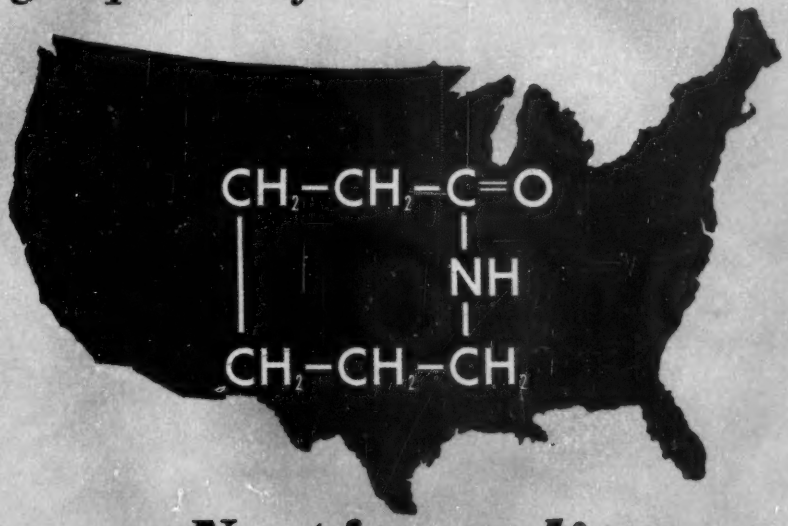
•

Drum Dryer: The Drumulator, a new drum-type dryer for feeds ranging from pasty to granular material, is available from The Jeffrey Manufacturing Co. (Columbus, O.). Material is fed into, and dried between, the drum and a stainless steel belt. Forced across the drum face by new feed, the material is repeatedly scraped off and refed. The machine is claimed to dry materials normally handled only by tray dryers.

•

Radiation Detective: Nuclear radiation and X rays now may be monitored with the Radiameter offered by the Electronics Division of the Curtiss-Wright Corp. (Carlstadt, N.J.). The unit weighs 2 lbs., fits into a suit coat pocket, and operates on an ordinary flashlight battery.

Never before available in America in tonnage quantity at an attractive price

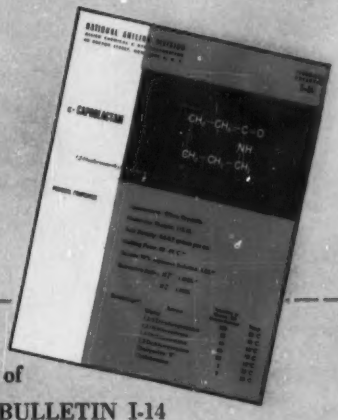


National® ε-CAPROLACTAM

Now in large volume, continuous production at Hopewell, this unusual 6-carbon chemical should have important uses in new organic chemical developments.

Best known as the monomer of Nylon 6, ε-CAPROLACTAM's interesting structure has many polymer-forming possibilities that should open new frontiers to inspired researchers. Ample basic material supply at an attractive price makes commercial exploitation of new applications potentially profitable.

Working samples and technical help are freely available to those whose work may lead to new volume uses. To initiate interest, we have prepared a 12-page brochure containing complete physical properties, known chemical reactions, suggested uses and a bibliography on ε-CAPROLACTAM. Correspondence is invited.



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Technology
Newsletter

CHEMICAL WEEK
June 30, 1956

You can expect to hear soon that R. S. Aries & Associates has licensed its polyolefin process to a large refiner. Neither Aries nor the oil company, however, is talking about it at the moment. But the arrangement is thought to be a nonexclusive one covering propylene, styrene and other olefins.

•

Amines make good oxidation inhibitors for grease. That's the conclusion reached by Army Ordnance after extensive tests of 45 compounds. Phenyldiamines were found to be particularly effective.

The tests were run in lithium soap-mineral oil greases and a number of greases of calcium and lithium-calcium soap with mineral oil. Only six of the inhibitors investigated were found capable of inhibiting more than 500 hours at 250 F.

•

A potentially valuable step in radioactive waste disposal has been taken by General Electric at the Hanford plutonium plant. G.E. has developed a technique for removing radioactive cesium from the waste. The cesium-free material can be pumped into pits scooped out of the sandy soil at Hanford. Now, radioactive wastes are sealed in costly steel and concrete containers.

Radioactive cesium, however, would still have to be stored in the tanks. The long (33 years) half-life of cesium makes it unsuitable for simple waste disposal. But, as G.E. points out, the same property makes it potentially valuable in medical therapy.

•

Coal just lost an important round in its competition with natural gas as a starting material for synthesis gas generation. (*For a blow in coal's favor, see p. 76.*) Du Pont has just decided to switch its Belle Works partial combustion process from coal to gas. The plant is, in fact, embarking on a modernization program due to be completed by the end of 1959. The Belle coke plant, too, will be converted to natural gas.

Wrote Plant Manager Fred Otto to employees last week: "In 1952, due to the uncertainties of a supply of natural gas, we decided . . . to install . . . coal partial combustion. Although . . . an improved process . . . it is not as economical a route to process improvement at Belle Works as the natural-gas process."

The modernization is described as a "multimillion-dollar program."

•

From now on, the tailoring of alloys for specific jobs will be a lot easier. That, at least, is how Westinghouse views its latest contribution to metallurgy. Clarence Zener, its acting research director, and A. W. Cochart, advisory metallurgical engineer, managed to marry physics and metallurgy in a newly advanced theory.

What they've done is correlate mechanical properties of metals with their magnetic properties. They've tested the theory on about 50 alloys, expect it to be helpful in turning up "thousands of new alloys."

The first fruits of the theory: Nivco, a high-cobalt and nickel alloy being unveiled this week. Designed for use on steam turbines, it features high strength, low vibration characteristics, and is reported to stand up under temperatures as high as 1200 F (this is 150 F higher than the 12% chrome alloy that has been going into Westinghouse's newest turbine designs).

•

Score more gains for chemical research against the tuberculosis bacillus:

• Morris Dworski, director of the Will Rogers Research Laboratory, reports that progress is being made toward development of a TB vaccine comparable "to the Salk vaccine in safety and effectiveness."

• A British patent (725,774) to Farbwerke-Hoechst (Germany) describes isonicotinoylhydrazones (made from isonicotinylhydrazine with aldehydo and oxo acids) that have TB activity equal to isoniazid—but with lower toxicity.

• Another British patent (707,590) to Farbenfabriken Bayer (Germany) claims thioureas having antitubercular activity are obtained by treating an isothiocyanate (obtained from 4-amino-2-hydroxybenzoic acid) with various amines and hydrazines.

• Work at the University of Milan (Italy) indicates that the toxic effects of isoniazid can be greatly diminished by the concomitant administration of adenosinetriphosphate (ATP) and the sulfur-containing amino acids, methionine, cysteine and taurine. Glutamic acid exerted a similar—though less striking—protective effect.

•

Commonwealth Engineering Co. of Ohio has an answer to the FDA ban on coal-tar dyes for citrus fruits: a process for extracting the carotene yellow pigment from the waste product of citrus rind. Rind is normally discarded or used for stock food in extracting juice for concentrates. The carotene is the basis for a natural dye that can be sprayed on the orange.

•

Here's what Los Alamos scientists had to overcome in achieving a proof (reported last week) of the existence of the free neutrino—an atomic particle predicted some 20 years ago by Fermi and Pauli.

Detecting the particle is almost like measuring "nothing." For the neutrino has no charge, and very little mass. It reacts only weakly with any material, so its penetration of solid matter could be expected to be extremely great—theoretically, on the order of light years.

Los Alamos researchers detected the elusive bit of matter by setting up a reverse beta-decay process. The source was a large reactor at the Savannah River, Ga., AEC plant. Target was 100 gal. of water containing a dissolved cadmium salt. This was observed by a scintillation system made up of 1,000 bal. of sensitive liquid and over 330 photomultiplier tubes. Although the reactor emitted billions of neutrinos each second, only a few were captured in the target water each hour.

From "Dutch Boy" research... a gel that prevents hard settling in lacquers, plastic finishes

In any paint, pigment particles tend to settle or float, agglomerate or separate.

If they migrate, paint performance goes down. Hues change. Streaking appears. Hiding is lowered. Hard cake forms.

Recent research at National Lead has developed gellants that make paint pigments behave. One of the latest is DUTCH BOY BENTONE® 18-C.

BENTONE 18-C gels high polarity organic solvents, the kind used in making lacquers and vinyl or epoxy resin finishes. In these paints, BENTONE 18-C locks pigments in place.

By its control over pigment suspension, BENTONE 18-C improves color and hiding in lacquers and plastic finishes. In vinyl anti-fouling paints, for example, BENTONE 18-C is unique in preventing hard settling of the heavy cuprous oxide pigment.

It also improves body. Stops sag. Aids spray-ability, hold-out, temperature independence.

Other "Dutch Boy" developments improve other compounds

DUTCH BOY BENTONE 34, for example, improves the characteristics of paints made with lower polarity solvents. Also greases, cosmetics and other compounds. DUTCH BOY BEN-A-GEL® does the same for water-based products . . . water-based paints, liquid polishes, abrasives, and others.

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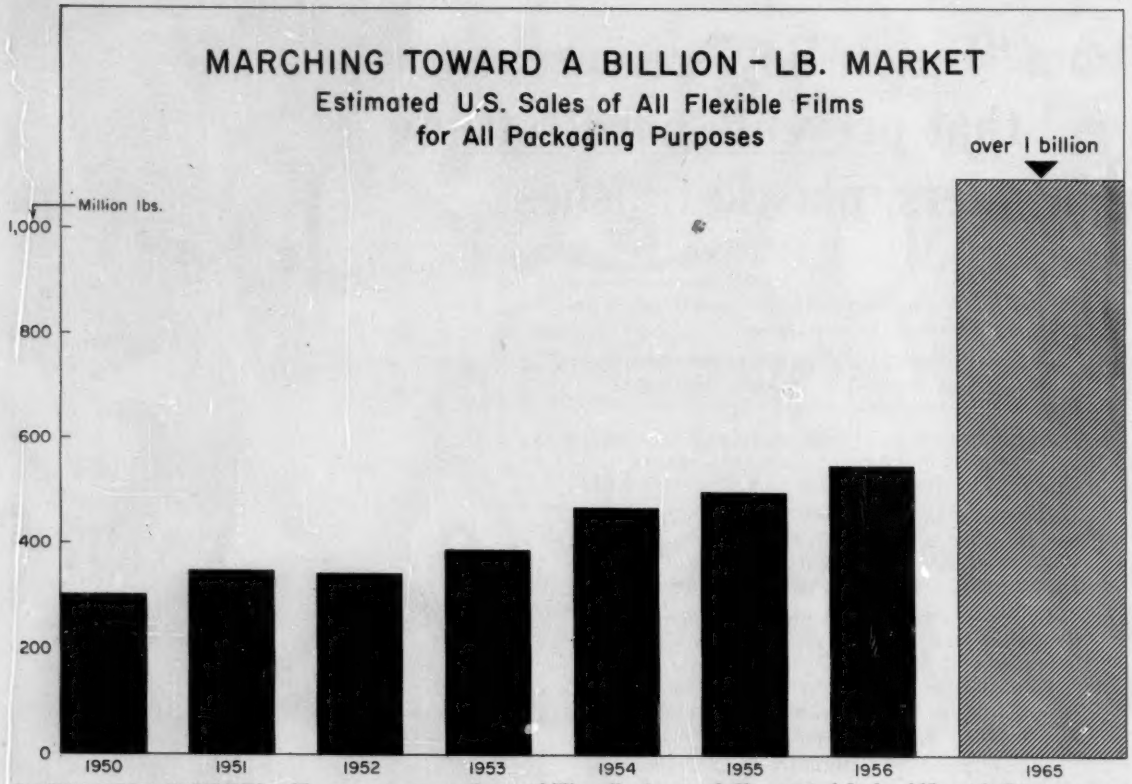

PACKAGING OUTLETS will consume more than a billion lbs./year of film materials by '65; and then, as now, cellophane will likely still be leading . . .

The Flexible Packaging Parade

The Supreme Court decision a couple of weeks ago clearing Du Pont of cellophane monopoly charges (*CW, June 23, p. 21*), and particularly the court's wording that cellophane "is only a part of the entire flexible packaging materials market," is focusing attention these days on both the pioneer film and the broad, multimillion-dollar transparent and semitransparent flexible wrapping business.

Cellophane is still the big-timer in the field, and indications are that it will continue to grow despite the influx of several other materials, including polyethylene, cellulose acetate, vinyls, vinylidene chloride polymers (saran, Cryovac), rubber chloride (Pliofilm), as well as the steadily rising demand for many non-plastic packaging materials, such as glassine, greaseproof and parchment, waxed papers, aluminum foil.

Underscoring cellophane's dilating future are these upcoming capacity increases:

• Olin Mathieson, which entered cellophane production in 1951 with a 37-million-lbs./year plant at Pisgah Forest, N. C., will, by the end of this year, have a new 40-million-lbs. installation operating at Olin, Ind.;

• American Viscose, which as recently as 1952 had a reported cellophane capacity approaching 100 million lbs./year, plans to convert an old rayon plant at Marcus Hook, Pa., and produce an additional 50 million lbs./year of cellophane there.

And though there is no verification by Du Pont, some trade talk has it that the U.S. cellophane trail-blazer is mulling over sizable expansions.

But to accurately evaluate cellophane's short- and long-term outlooks one must first consider the over-all transparent and semitransparent flexible packaging market.

Current U.S. sales of such items are estimated at some 550 million lbs./year, worth something over $300 million. By 1960 consumption will likely hit close to 700 million lbs.—more than double the 347 million lbs. sold in '51. And in the 5 years beyond '60, sales of these flexible films will probably reach, or even exceed, the billion-lbs./year mark.

There are many reasons for such optimistic predictions, but perhaps the most important is the anticipated growth in the U.S. in prepackaging produce, meats, poultry, other foods, and non-food items.

Prepackaging Spur: Whether the trend to self-service super-markets was sparked by developments of new films and special packaging techniques or vice versa is a debatable point. Significant, however, is the increase in the number of grocery stores with complete self-service meat facilities—

How Du Pont SPECIALTY Surface Active Agents Can Be Helpful to You

There's a good chance a Du Pont specialty surface active agent can help you no matter what you're working on currently. That may sound like a sweeping statement, but frankly, we're amazed at the ways chemists and manufacturers use these materials. Nothing could surprise us now.

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Tell us about your application... We can't come up with the right answer every time in this complex, diversified field, but we're only too glad to offer you the benefit of our experience. Why not give us the details of the possible application you have in mind? We'll do our best to suggest the best surface active agents for your use. Just fill out and mail the coupon below.

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from less than 200 in 1947 to almost 15,000 today. (This year alone some 3,000 new super-markets will open—a record expansion.)

The meat and poultry outlet for films—though relatively small (*see end use pattern below*)—is wide open for expansion. There are approximately 17 billion lbs. of meat consumed annually in this country, but only about 5 billion lbs. are now being packaged in transparent film, requiring as much as 65 million lbs. of film.

Of the 2.5 billion lbs. of fresh poultry consumed each year, some 860 million lbs. are plastic-wrapped—an estimated 8-million-lbs./year market for film. In addition, frozen poultry, about 20% of all poultry sales, takes about 1.5 million lbs. of packaging films (mostly Cryovac and polyethylene) and appears well on the way toward needing double that amount.

Thus, with only 25% of the meat and about 35% of the poultry currently being wrapped in film, it's apparent that such usage has a great potential, and that this double-barreled outlet alone could take a sizable portion of the billion-pound estimate of transparent film consumption by '65.

It's in fresh fruits and vegetables, though, that most film makers and converters expect the big payoff: this area is ripe for an explosive development and expansion in the use of packaging techniques.

The Dept. of Agriculture, for instance, recently estimated that only about 15% of the 75 billion lbs. of produce grown each year in the U.S. are now bagged, trayed, over-wrapped, labeled, or otherwise packaged. But the marketing director of one of the world's largest food-store chains predicts that in 10 years, more than 75% of all fresh fruits and vegetables will be prepacked at grower, terminal, or retail level. Other marketers say this percentage will be reached in half that time.

One indication of film makers' potential markets is that currently only about 5 billion lbs. of the produce grown are prepacked in transparent film materials—7% of the fruits and vegetables consumed.

And film use for such purposes is definitely moving upward. In 1950 about 12 million lbs. were used in produce packaging; by '53, consumption had risen some 65%; and by last year, use with fresh fruits and vegetables was running at a 40-million-lbs./year clip. A tripling in the next decade or so is not out of line considering the expected growth of the packaging industry as a whole.

Down to Specifics: USDA lists more than 40 fresh fruits and vegetables that are now being prepacked to some degree. Of these, carrots have been tucked into transparent packages at the fastest rate. In 1950, only about 5% of the carrots were prepackaged; now almost 75% are. Removing the green tops and prepackaging results in a freight saving of about 30%.

Other produce items and the percentage of the total crop now estimated to be prewrapped: spinach, 75%; tomatoes, 60%; mushrooms, 56%; cranberries, more than 60%.

Among heavier products being prepackaged are potatoes and apples—about one third of the total crop. (Maine shipped its first polyethylene-bagged, washed and graded potatoes in '54, and, more recently, has been experimenting with prepeeled bagged potatoes—a use loaded with film-growth possibilities if it gains wide consumer acceptance.)

Produce packaging, of course, requires a wide variety of materials, including wood and fiber shipping containers, aluminum foil liners, textile bags, multiwalled bags, baskets, etc. But even more varied is the need for film. Involved: specific metabolic and preservation requirements of the individual product to be packed.

Then, Now, Ahead: Cellophane, as noted, is still widely used in this and many other film-consuming areas, and although other types of transparent, semitransparent, and opaque materials are providing some sharp competition for a number of once-exclusive cellophane outlets, the latter's future seems to contain the same assurance of growth that has characterized its growth in the past.

It's difficult to pinpoint cellophane production in the U.S. because of the lack of official statistics, but some fairly accurate "guestimates" do point up the over-all picture (*see chart p. 94*).

Output in '49 was estimated at somewhat above 210 million lbs. Du Pont had about 75% of total U.S. capacity, while American Viscose, the only other producer at the time, held 25%.

During 1951, the peak year for most chemical commodities, cellophane output from Du Pont, American Viscose, and Olin, the later entrant, climbed to about 280 million lbs. Production tapered off in '52, though, because of "excessive inventory" the reason generally advanced.

By mid-'53, however, demand for cellophane had perked enough to take up all the excess material hanging over the market, and cause the country's production rate to crowd 300 million lbs./year. Du Pont's expansion alone in '54 added some 25 million lbs./year to U.S. capacity, and further expansions later lifted the industry's producing capability to about 350 million lbs./year.

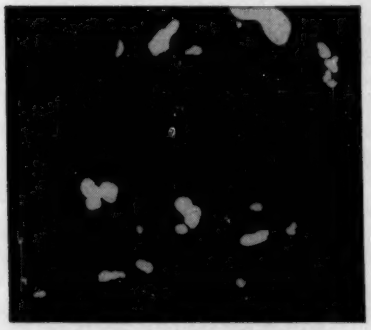
Within the next four years—by 1960—plant refinements, improvements in production methods, and new plants will boost annual U.S.

Transparent Flexible Films
End-Use Pattern
(Estimated for 1957)

Bakery goods	30%
Meats, poultry	16%
Confectionery, gum	8%
Fresh fruits, vegetables	10%
Other foods (popcorn, potato chips, teas, coffee, etc.)	17%
Tobacco (cigarettes, cigars, etc.)	10%
Other non-foods (textile, leather, hardware, etc.)	9%
	100%

ALCOA ATOMIZED ALUMINUM POWDER now readily available

Reduced military demand frees large quantities for growing list of industrial and chemical uses



Photomicrograph of ALCOA Atomized Aluminum Powder No. 120 at 100x. Non-leafing. Average mesh size—100% through 40 mesh, 40% through 325 mesh. Average particle diameter, 26 microns. Specific gravity approximately 2.72. Bulking value .0441 gal/lb.

ALCOA® Atomized Aluminum Powder is a finely divided, granular aluminum powder produced by blowing molten aluminum through fine atomizing nozzles and collecting the product in a dust collector. Particles are more or less spherical or tear shaped, with a relatively low surface area.

Because ALCOA Atomized Aluminum Powder has high fuel value and is chemically reactive, it has found widespread use in explosives both during and since World War II. Reduced military requirements now have released large quantities of atomized aluminum powder to meet the rapidly increasing civilian demands for this versatile product.

APPLICATIONS

The potential uses for ALCOA Atomized Aluminum Powder have not been fully exploited. New markets are opening every day. Some of the more interesting current uses follow:

PLASTIC DIES—Mixed with synthetic resins (like the new epoxies) to produce stamping or forming dies, ALCOA Atomized Aluminum Powder provides better heat transfer, appearance, dimensional stability and malleability, and reduces shrinkage as well.

EXOTHERMIC REACTIONS—Used where high heat and a reduced metal are desired.

EXPANDED (AERATED) CONCRETE—Mixed with cement, sand and water.

PYROTECHNICS and EXPLOSIVES

CHEMICAL USES—Aluminum's strong reducing power and ease in replacing metals from other compounds and solutions are utilized to recover gold and silver from cyanide solutions and help in the production of alum by reducing ferric iron to the ferrous form.

CERAMIC MIXTURES—Gives added strength to ceramic forms.

COLD SOLDERS—Mixes with vinyl resins to form a plastic compound.

HOT SOLDERS—Used in filling solders which then require less heat than regular tin alloy solders.

POWDER METALLURGY—Placed in a die and compressed to a solid shape.

GRINDING WHEELS—Improves uniformity of dimensions and disperses heat evenly throughout wheel.

REFRACTORY SAGGERS—Permits higher temperatures, and extends service life.

LUTING COMPOUNDS—Improves heat transfer in solutions.

CATALYST CARRIERS

REDUCING AGENT—Used successfully as a substitute for zinc.

POLYETHYLENE PRODUCTS—Minimizes shrinkage.

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ALTERNATE SUNDAY EVENINGS

cellophane output to a near-500 million lbs. Thereafter, the production rate should move up steadily, come close to 600 million lbs./year by 1965.

Where will it all go? Taking a short-term view of cellophane's consumption pattern, it's estimated that about 80% will be used next year in food packaging, while the rest will filter into packaging of tobacco, textiles, drugs, paper products, and a miscellany of other lines.

Cellophane is tops now, and will probably continue to be, in the field of packaging baked goods. About a third of the 350 million lbs. sold is used to protect and enhance the sales appeal of breads, crackers, biscuits, doughnuts, pastries, and many other baked products. Marketers aren't hesitant about predicting that within five years wrapped baked goods will take as much as 150 million lbs./year of cellophane.

Cellophane meets two essential requirements for foods in this category —low cost, and ease of handling on automatic wrapping machines. Pointing up the economy of using cellophane: at an average price of 59¢/lb. (for moistureproof, heat-sealing material), the cost of 1,000 sq. in. of 300-gauge film is 3¢.

Polyethylene Push: Close on the heels of pace-setting cellophane, and passing it in the produce field at least, is polyethylene. Reason: for the heavy, larger items (potatoes, apples, citrus fruits), where the packages are subject to rough handling, cellophane bags may not be sufficiently durable.

According to trade estimates, two years ago about 8 million lbs. of cellophane were used for produce packaging; by now the rate probably tops 10 million lbs./year. As recently as 1953, polyethylene used for this purpose totaled about 6 million lbs., and by '55 consumption had climbed to an estimated 20-million-lbs./year rate.

Although not as completely transparent as cellophane, polyethylene is obviously the most likely film to come anywhere near matching cellophane's total consumption level. (Currently about 90 million lbs. of polyethylene are used in all forms of packaging, and, according to one seller, by 1960 it will account for 225 million lbs. of the total market.)

At least a dozen U.S. companies are already producing or planning to produce polyethylene resin, and there are probably more than 50 extruders now turning out the material in film form. Thus it's almost certain that an ever-increasing proportion of resin production will go into film making. This increase in resin availability (830-million-lbs./year capacity by 1958), and at probably reduced prices, will continue to give polyethylene a push toward becoming one of the less expensive wrapping materials in cost/unit of surface covered.

Polyethylene's inherent properties make it an excellent packaging medium for specific jobs. It has low levels of taste and odor, low water absorbency, and a good level of moistureproofness. Toughness, durability, chemical inertness, plus good flexibility even at extremely low temperatures, have led to its wide acceptance as a frozen food packaging film.

Other packaging fields where polyethylene film has become established include larger textile items, hardware, small industrial parts, and candy.

Despite the apparent competition afforded cellophane in some of these packaging outlets, the advent of polyethylene may actually help the former grow. Typical of the frequent developments that have improved the protective and handling qualities of flexible packaging films are some surprising combinations of two or more diverse materials. One of the most recent: polyethylene-coated cellophane.

The marriage of these two major packaging materials produces a film with the better qualities of each and at a lower cost than for laminating two separate films.

There are no production and consumption data available yet on the polyethylene-coated cellophane, but the material is now being produced in commercial-scale quantities in several grades and weights. Most of the output is going into bags or pouches that are heat- or adhesive-sealed.

Saran-Coated Moves: Rapidly gaining an accepted position in the field of transparent packaging is a saran-coated cellophane. Here the modified vinylidene chloride polymer coating lowers the rate of water-vapor transmission, improves appearance, imparts greater strength, dimensional stability, and resistance to acids, alkalis, and gases. It also aids in minimizing the effects of aging.

Actually, though, it seems highly unlikely that saran-coated cellophane will have much effect on the markets for regular cellophanes. Conventional cellophane is perfectly adequate for

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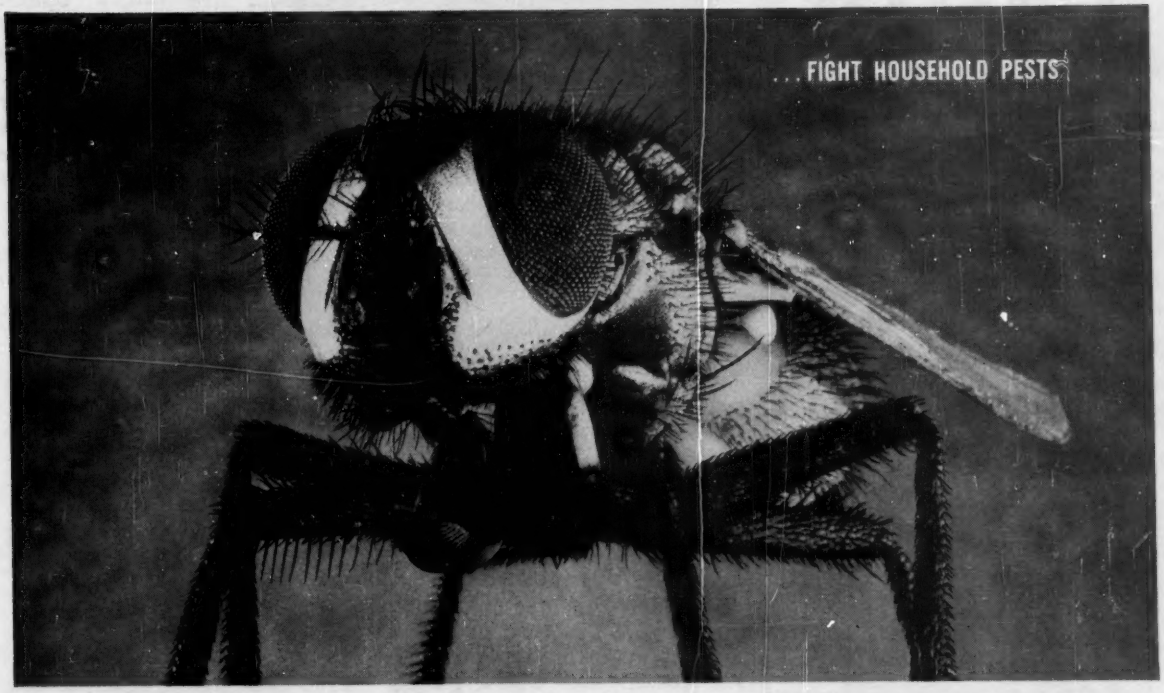

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HERCULES

CHEMICAL MATERIALS FOR INDUSTRY

most of its applications. Too, the saran-wedded material is relatively expensive.

The coated film does offer an extra margin of protection for those products that need it, however, and can justify the higher cost.

Perhaps more generally known, as a result of extensive television promotion, is Dow Chemical's Saran Wrap. While some saran is now being utilized in general transparent film outlets, Dow has concentrated on the home-wrap front, an area where cellophane is comparatively little used.

The company's particular problem, when it launched Saran Wrap, was that this home market appeared to be virtually saturated. Wax paper and aluminum foil were dominant, seemed to satisfy all the housewife's wrapping needs. And the choice was wide. There were, at the time, nearly 30 name-brand wax papers and aluminum foils on retail shelves, and at least 6 of these were of major significance.

But Dow decided to promote its product as an addition to the market rather than as another competitor; it felt certain that saran's primary appeals of transparency, cling, and the fact that it kept foods fresher longer than most other materials, were keys to consumer acceptance.

Evidently the campaign has paid off. Last year Dow opened a new 10,000-sq.ft. plant to turn out more than 5 million rolls of Saran Wrap a month.

Rubber Wrap: Goodyear's Pliofilm, one of the earliest flexible film contenders, has been a comparatively slow mover in the packaging market. Although there are no actual production and consumption figures available —Goodyear is the sole producer—use in packaging probably doesn't exceed 15 million lbs./year. Compared with cellophane's hefty 350-million-lbs./year consumption, this is indeed a thin slice of the business.

Pliofilm, a plasticized and stabilized rubber hydrochloride, is produced by treating a natural rubber cement with hydrogen chloride gas; the resulting resin is neutralized and dissolved. The solvents are then evaporated by heat, leaving a transparent film.

The material is inherently moisture-proof and makes strong seals. These attributes have opened up a successful outlet in the packaging of some liquids and foods with high moisture content (e.g., cheeses, meats, products packed in brine).

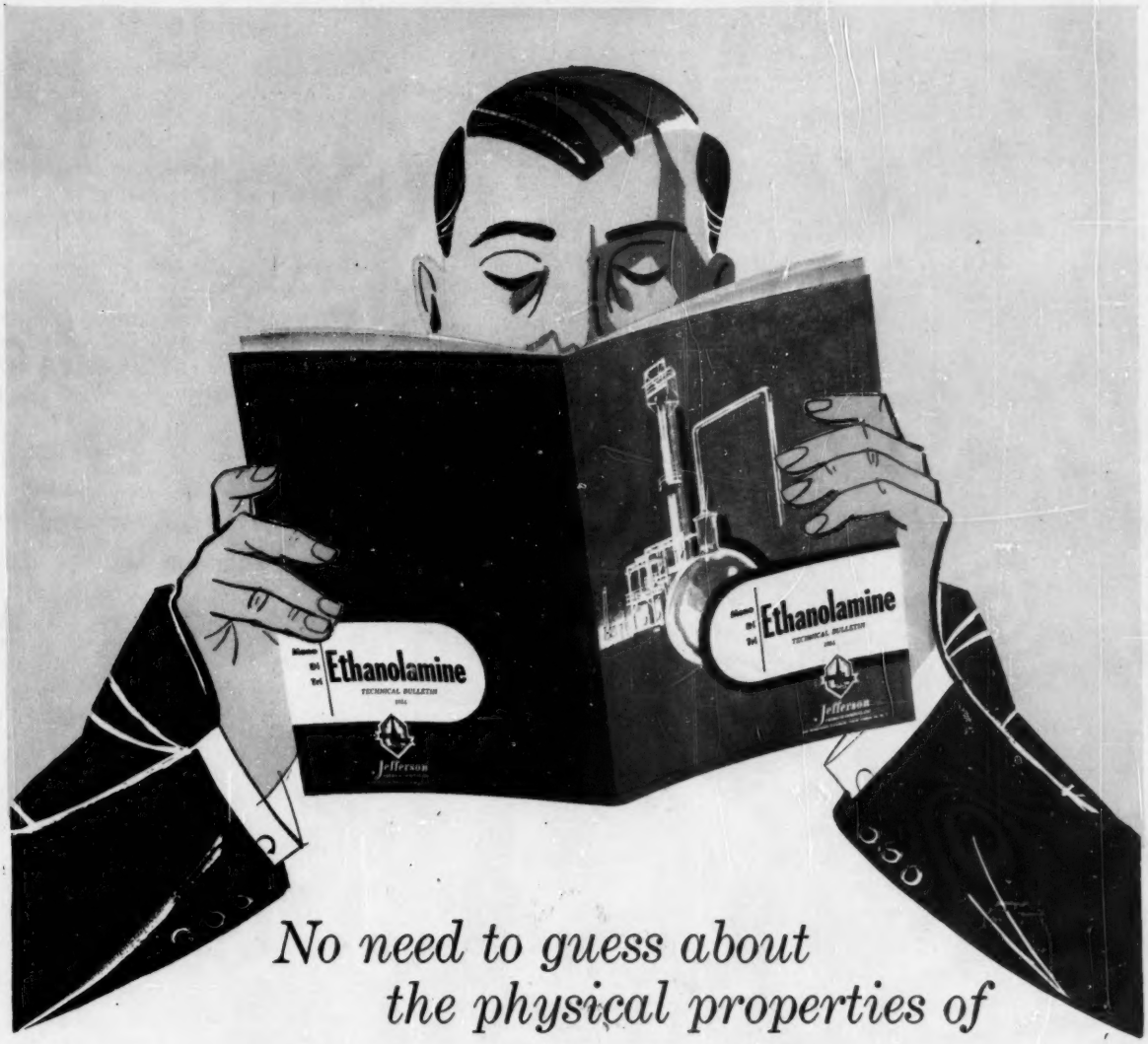
Cellulose Acetate—Low Uptake: Cellulose acetate, like cellophane and Pliofilm, was one of the earliest (1920) to break into the flexible film market. But again, as with the rubber-based film, its use in packaging has remained small compared with cellophane's. The acetate, however, has many properties that will nudge consumption upward —good transparency, clarity and brilliance; transmits 90% of visible light.

Further, because of its insensitivity to softening by water and its high rate of water and gas transmission, cellulose acetate film is cutting a wider swath through produce packaging outlets in particular. Spinach packers, for instance, have enthusiastically taken to the acetate's "breathing" characteristics. And lemons, limes, tomatoes, mushrooms, and other fresh foods are increasingly being wrapped in the material. (In thicker gauges acetate is becoming more important in rigid transparent containers.)

Again using produce packaging as a benchmark, the material's acceptance can be charted from these estimated statistics: in 1946 less than a million lbs. of thin-gauge cellulose acetate were consumed for fresh produce. Last year's reckoning of such consumption was some 2 million lbs. Use will likely double in the foreseeable future, but even an anticipated 4-5 million lbs./year isn't much in the film picture.

Polyester Entry: Aimed at cellophane's weaker fields, heavy-duty outlets, is Du Pont's comparatively new polyester film, Mylar. It's expensive, but is reported to be exceptionally strong, brilliantly clear, and have printing and handling qualities generally similar to cellophane. Mylar's great strength, immunity to acids, alkalis, oils and solvents, and its heat- and water-proofness, Du Pont spokesmen say, will enable it to compete successfully with other materials (e.g., polyethylene, Pliofilm) in the packaging of heavy textile products, hardware items, and the like.

U.S. Mylar production is small now, and most of it goes into insulation, vapor-barrier materials, recording tapes, metallic yarns, decorative surfacing, and covering for acoustical tiles. Packaging forms include wraps and bags, but by far the largest, and expected to remain so for some time, is as windows in folding cartons. In



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fact, despite Mylar's higher price, one box maker has predicted that the film will one day capture virtually the entire window film market. (At the moment, Du Pont is the only polyester film producer, but other companies are eyeing plans for similar films.)

Nonplastic Impact: Aluminum foil producers in the U. S. have for years regarded the flexible packaging market as a profitable outlet. Today, about 75% of the foil made winds up as a packaging material. How impressive such use has been—and will be—can be surmised from these output figures:

Two decades ago, aluminum foil production was about 20 million lbs./year. (Note that cellophane production at that time had reached the 100-million-lbs./year level.) By 1953, foil output was up to 115 million lbs., and production rose an additional 23 million lbs. during the following year.

Turnout for '56 is estimated well above last year's near-180 million lbs., will probably tally about 190 million, with some 140 million lbs. going into hundreds of packaging applications—foods, tobacco, labeling, gift wrapping, home freezing and cooking, dairy products, chemicals, cosmetics, drugs, and protection of metal products in shipment.

Cellophane and other flexible films have felt these foil encroachments to some extent, but, by and large, overlapping has been small. Plain, unsupported foil is expected to be used more widely in semirigid containers for bakery products, specialty foods, and frozen cooked foods (complete dinner trays, for example). Other uses: wraps for yeast, hard candy, chocolate, cheese, as overwrap for frozen poultry.

Aluminum foil boosters are more inclined to anticipate a steady growth in packaging consumption through population increase and accelerated use in new applications, than through any great bucking of transparent films. And such factors alone presage a healthy level of business for the future. By about 1970, trade analysts say, annual foil production will be about 350 million lbs., with perhaps 240-250 million lbs. headed for packaging applications.

Paper Hurdle: Paper — glassine, greaseproof, parchment, waxed—is, of course, one of the oldest food packaging materials. And it was the glassine-type papers with which cellophane

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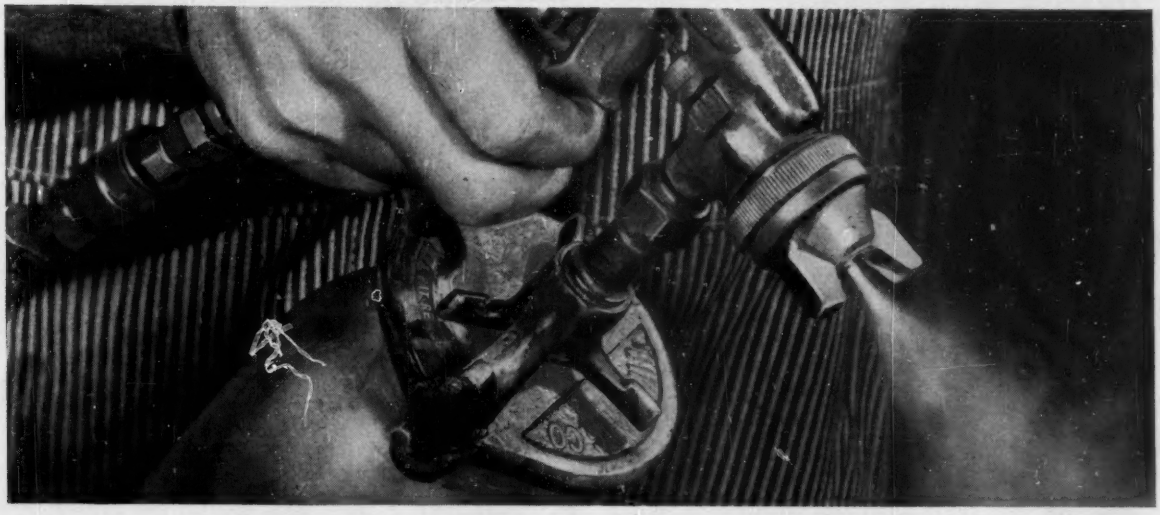

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is better when you manufacture with Enjay Ketones & Solvents

Paint remover and lacquer require uniform, high quality, active solvents to assure best performance. That's why Enjay Methyl Ethyl Ketone and Acetone are in demand by the surface coating industry.

The Enjay Company, a recognized leader in the Ketone and Solvent field, offers you a dependable supply of these high quality materials.

In addition, the Enjay Technical Service Laboratories are available to assist you in the application of all Enjay products. Write or call for complete information.

Enjay offers a diversified line of petrochemicals for industry: KETONES AND SOLVENTS (Methyl Ethyl Ketone, Acetone, Isopropyl Acetate, Secondary Butyl Acetate); and a varied line of LOWER ALCOHOLS, HIGHER OXO ALCOHOLS, OLEFINS AND DIOLEFINS, AROMATICS.

ENJAY

Pioneer in Petrochemicals

ENJAY COMPANY, INC., 15 WEST 51st ST., NEW YORK 19, N. Y.
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—and later plastic films and metal foils—had to contend while breaking into the flexible packaging field.

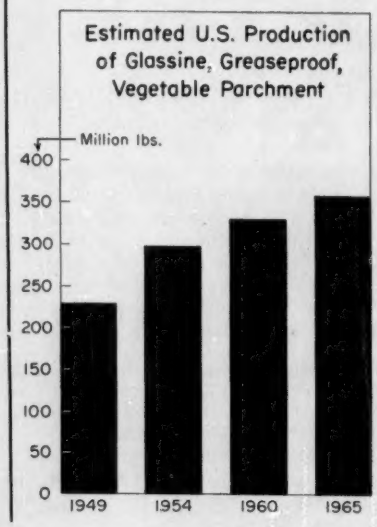
But despite paper's long history in packaging, enthusiastic producers insist that glassine could still be regarded as a "new development," since it has proved versatile and readily susceptible to many modifications for widely varying end-uses. Glassine, they point out, is available in an almost unlimited range of weights, degrees of clarity and greaseproofness. Boast of the industry is that it can supply any type of glassine, greaseproof, or vegetable parchment material on order.

There are few official government statistics available on the various papers, and the trade, too, has been traditionally reticent about revealing the magnitude of its operations. Some studied estimates, however, indicate that future growth will be steady, though scarcely matching cellophane's expectations (*see chart below*).

Output of the three leading papers is estimated at about 300 million lbs./year; it will probably climb to no more than 330 million lbs. in the next five years, and not over another 30 million by 1965.

Although a number of paper products have been replaced by the newer packaging materials, even the strongest competitors concede that paper will continue to be a formidable opponent in the constant battle for some markets.

In addition to its other attributes, glassine is smooth and dense, and is an excellent base sheet for coatings



chemical plants

by FOSTER WHEELER

Process design is the most important engineering function in the building of chemical plants,—in many cases the design data are of a strictly confidential nature, having to do with unusual physical-chemical characteristics of charge, products and intermediates.

Foster Wheeler has completed a number of chemical plant installations in which the final process design was the collaborative product of the client's basic design and Foster Wheeler's cumulative design experience in many industries.

After the process design has been approved, Foster Wheeler specialists take over the detailed operations of engineering, procurement, fabrication and, finally, the construction of the complete chemical process plant.

Experience proves that time and money are saved when the entire project is one contractor's undivided responsibility. *Foster Wheeler Corporation, 165 Broadway, New York 6, N.Y.*

FOSTER FW WHEELER

with special properties such as heat-seal, gloss, water-vapor-proofness. One of the principal coatings is paraffin wax, of course; and, as part of their campaign to recapture some lost outlets, paper manufacturers have turned to modifying the wax with film formers and resins to improve gloss and heat-seal.

Greaseproof papers (made from special sulfite pulps) are also widely used in packaging food. Foil and films continue to move into this area, but the greaseproofs are still dominant in the packaging of lard, butter, margarine, ham, bacon, and similar products.

Too, while cellophane has made strides as a wrapper for white and specialty breads, waxed papers are still way out front in number of loaves packaged.

On the other hand, for cakes and other baked sweet goods, the papers appear to be losing out. A few years ago, wholesale bakers packaged their wares almost entirely in glassine and waxed papers, but today it's estimated that this outlet is divided about evenly with cellophane—an increase of approximately 10% for the latter.

Another growing outlet for cellophane in the baked goods field is in the fractional (or inner-sealed unit) packaging of crackers and biscuits. This type of packaging, which provides protection after the master package has been opened, is spreading to such foods as cereals, rice, potato chips, and pretzels.

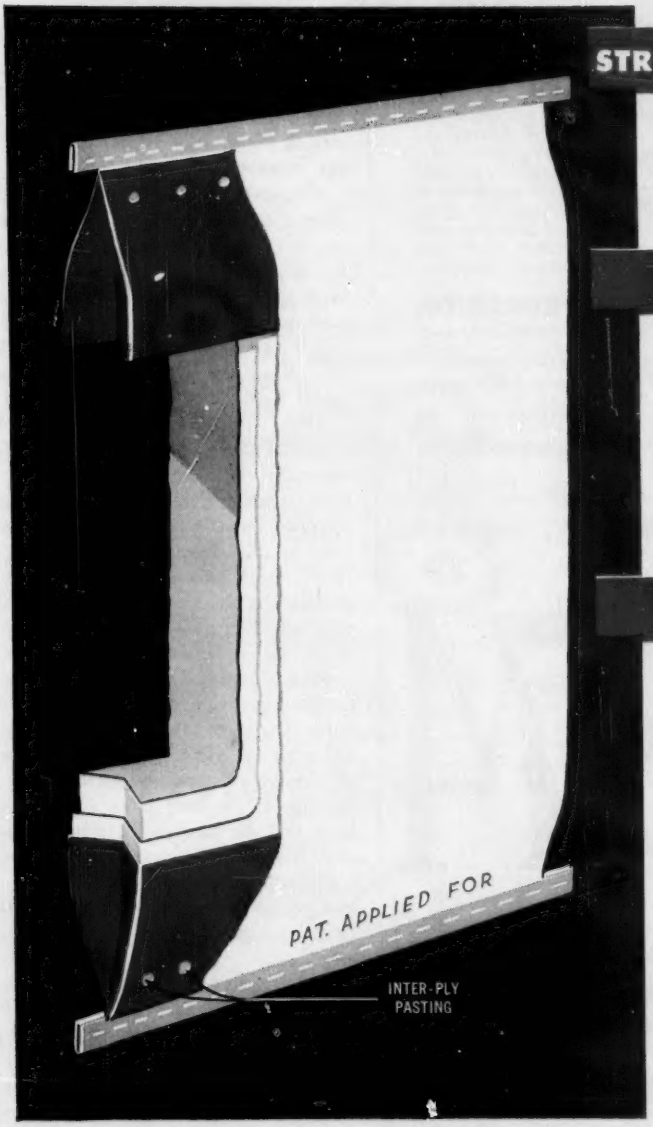
Another closely related development, bundling (dividing the contents of a shipping case into easier-to-handle fractional units), protects the packages during distribution and shelf storage. Here cellophane is extensively used in light packaging (e.g., drugs), and film use may climb with Mylar for heavier items.

Two-piece chipboard cartons and kraft paper wraps, printed or imprinted, are generally used now. The paper, of course, is less expensive than the films, but not enough, aver sellers, to discourage greater use of the latter in the near future.

The advantages of using a transparent film for bundling are clearly obvious. No imprinting is necessary because the packages show through; the sparkling film adds a "quality look," and the sales appeal of package color and design is utilized when these

New *Strength-end* * Bemis Multiwalls

the shipping sack with BALANCED STRENGTH



STRONGER AT THE RIGHT PLACES

New Bemis Strength-End Multiwalls, strengthened top and bottom where most sewn bag breakage is experienced, will cut packing troubles and costs for you.

TWO WAYS TO SAVE

You'll save money one of these two ways with Bemis Strength-End Multiwalls: You may switch from a more expensive type of shipping container. Or, if you are already using multiwalls, you might use bags with fewer plies, because of the greater end strength, where it is needed. Bemis Strength-End Multiwalls may, at lower cost, do your job as well or better.

SUCCESSFULLY TESTED

Bemis Strength-End Multiwalls have been successfully tested in all sections of the country and under all climatic conditions. They have proved themselves for packing cement, fertilizer, chemicals, flour, salt.

Here's how it's reinforced

The reinforcement in Bemis Strength-End Multiwalls is a strip of sturdy kraft, several inches wide, running horizontally around the bag at the ends . . . anchored to the other walls so it works in conjunction with them . . . and adding greatly to the strength both at the sewing line and at the gusset corners. It's just plain, common-sense, balanced strength construction.

*TRADE-MARK

Get the complete story about Bemis Strength-End Multiwalls from your Bemis Man.

Bemis

BEMIS BRO. BAG CO.

General Offices—St. Louis 2, Mo.
Sales Offices in Principal Cities

multiple units are stacked on retail shelves of food, drug, toiletry, and hardware stores.

Formidable hurdles for many of the newer packaging materials are the more than 200 different types of vegetable parchment papers currently being sold; many are aimed for wrapping chores.

Without these types of papers, it's doubtful whether some industries (e.g., potato chips, popcorn, salted peanuts) could have achieved their current giant statures. Significantly, however, while papers still lead as wrapping for such commodities, cellophane within the last five years has moved in to take nearly a third of the market.

In another packaging arena, wrapping of tobacco items, cellophane long ago wrested top honors from glassine. It's estimated that the former is now used as the outer wrap on paper-foil packages for 80-85% of the cigarettes sold in the U.S. Before 1930, such cellophane use was negligible compared with use of glassine.

Thus, with the continued growth of cigarette consumption—record use is reportedly well on its way in '56 despite cancer alarms—and other wrapped tobacco products, cellophane sales in this category seem definitely rising. And tobacco is a fairly important outlet in the over-all flexible packaging picture—it takes about 10% of all such materials produced.

Film Wrap-up: It's difficult to imagine our economy without flexible films. Their contributions in the past 10 years or so to cleanliness, ease of handling, package attractiveness, shaving of shipping costs and waste have laid the basis for a vital multi-million dollar industry.

Probability of further growth in the bustling packaging business is assured by at least three aspects of its development:

- Rapid technological advances in packaging methods.
- Enthusiastic retailer and consumer acceptance.
- Aggressive promotional programs instituted by food sellers and film producers.

Cellophane has been the vanguard in the flexible film packaging parade for many years, and though the ranks have grown with the advent of plastic films, metal foils and other wrapping materials, it's a safe bet that cellophane will still be leading a decade from now.

Vinyl compounders –

you benefit by specifying plasticizers made from

Indoil OXO ALCOHOLS

Here's how– You sell finished product by volume rather than by weight. You get the most volume at lowest cost by buying plasticizers on the basis of volume of finished product, not weight of finished product. At equal cost per pound Oxo Alcohol plasticizers such as DIOP and DDP are cheaper to use. Here is a comparison:

	DOP	DIOP	DDP
Density 20/4	0.983	0.983	0.963
EMC* at 1,600 psi	50.3	51.4	53.7

**Equivalent Modulus Concentration (phr)*

INDOIL plastics evaluation laboratory checks quality of INDOIL Alcohols by testing finished product. Here operator measures elongation of plasticized vinyl strip to determine Equivalent Modulus Concentration of plasticizer.

No need to reformulate—Compounders plasticizing with DOP need not refigure formulations in order to use DIOP or DDP. They can be modified by using this table:

Ratio $\frac{\text{Plasticizer phr}}{\text{DOP phr}}$	100% Elong. at 1,600 psi	100% Elong. at 900 psi
DOP	1.000	1.000
DIOP	1.022	1.019
DDP	1.068	1.086

Contact your supplier— Ask your plasticizer manufacturer for samples of DIOP, DDP and other esters made with INDOIL Oxo Alcohols. INDOIL Chemical Company does not manufacture esters.

Information–Send for INDOIL Oxo Alcohol Bulletins.

INDOIL® CHEMICAL PRODUCTS

INDOIL CHEMICAL COMPANY, 910 South Michigan Avenue, Chicago 80, Illinois

When the pressure is on

As a final step in the manufacture of Powell Valves, every valve is subjected to an *actual line test*—a *positive method* of testing. For special services, valves can be given hydrostatic, air and gas tests so that they will meet various fluid control services.

Thus, when the pressure is on *you*—when you have a production schedule that must be met—that's when you'll be glad you installed Powell Valves.

No matter what your flow control problem may be, Powell has valves designed to solve your problem. And you can *depend* on long, trouble-free service. Through careful quality control, *every* Powell Valve has PERFORMANCE VERIFIED.

Because of Powell's painstaking quality control, plant shutdown through valve failure is greatly reduced. Records from refineries, power and industrial plants the world over prove it.

Consult your Powell Valve distributor. If none is near you, we'll be pleased to tell you about our *complete quality line* which has *Performance Verified.*

The Wm. Powell Company
Cincinnati 22, Ohio

. . . 110th YEAR

PERFORMANCE
PV
VERIFIED

Bronze, Iron, Steel and Corrosion-Resistant Valves

FIG. 2453-G—Large Size Stainless Steel O.S. & Y. Gate Valve for 150 Pounds W.P.

FIG. 2342—Stainless Steel Bolted Cap Swing Check Valve for 150 Pounds W.P.

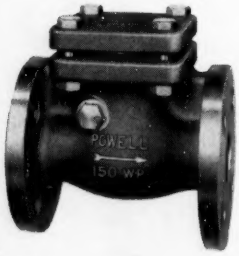
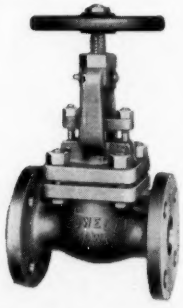


FIG. 2475—Stainless Steel O.S. & Y. Globe Valve for 150 Pounds W.P.



POWELL VALVES

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U.S.I. CHEMICAL NEWS

June 30 ★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1956

Teflon Can Be Bonded After Sodium Treatment

A new surface treating technique has been devised which enables Teflon to be bonded either to itself or to other materials. Until now the poor bonding characteristic of this corrosion resistant plastic has severely limited its application in many fields.

Here's how it's done! After solvent cleaning to remove surface grease and grime, the Teflon is dipped for a few seconds into a solution of 1% metallic sodium in liquid anhydrous ammonia. It is quenched in water, allowed to stand in the air, and then it can be cemented to aluminum, mild steel, wood or more Teflon with conventional adhesives. Bond strengths – both straight and shear tensile—are high enough for most applications.

Manufacturers of corrosion resistant tanks, pipes, ducts and valves who have been eyeing Teflon as a lining material for a long time now have a technique that will enable them to put many of their ideas into practice. Those who will be using metallic sodium for the first time in this application will find a great deal of valuable know-how in U.S.I.'s new 40-page book, "Handling Metallic Sodium on a Plant Scale." This book is available from U.S.I. without charge.

Methionine Helpful In Reducing Obesity

Methionine's ability to facilitate the mobilization and transportation of body fat during weight reduction has led to its use in a new drug formulation employed in treating obesity.

The new formulation contains amphetamine, phenobarbital, methycellulose, choline and vitamin B_{12}, in addition to DL-methionine. The methionine acts to relieve fatty infiltration of the liver, which, in cases of obesity, is already overburdened.

The new drug product was used in conjunction with a dieting regimen and was found to be well tolerated, convenient to take and therapeutically potent.

U.S.I. People Speak On Sodium At ACS Meeting

Metallic sodium was thoroughly discussed in a Symposium on "Handling and Uses of the Alkali Metals", at the 129th National Meeting of the American Chemical Society held at Dallas, Texas, in April. Among the papers was one entitled, "The Sodium Peroxide Production Story", by H. R. Tennant and R. B. Schow, describing the use of sodium in the manufacture of sodium peroxide at U.S.I.'s Ashtabula, Ohio plant. Another paper entitled, "Modification of Method for Determination of Sodium Monoxide in Sodium", by Dr. V. Hansley and R. A. Kolbeson of the U.S.I. Cincinnati Research Laboratory was also presented.

NEW EXTRA-WIDE POLYETHYLENE FILM CAN SOLVE MANY PROBLEMS IN CHEMICAL FIELD

Chemical Process Industries Welcome 22 Foot Width As Answer To Many Temporary Or Emergency Situations

Tough, flexible polyethylene film is now available in widths up to 22 feet. These newly available sizes offer simple, economical solutions to many of the problems that chemical processors face daily – in plants, pilot plants, and laboratories. Available from a number of film converters, the new, extra-wide films are made in a variety of heavy-gauge thicknesses and are folded into rolls of convenient width for easy handling.

Protects Personnel and Materials

Here are some examples of the use the film may be put to. Equipment may be sitting idle, or lying in storage, or in the process of being moved from one place to another – subject to dust, moisture or a chemically corrosive atmosphere. A polyethylene cover can be installed in minutes to provide protection. Or if solid raw materials have to be stored before use in a spot where conventional storage facilities are inadequate, a processor can spread the polyethylene film, dump the material on it, then cover the whole with another sheet of tough, impenetrable polyethylene. Rock salt piles for winter highway use are stored that way in some northern states. And bulk shipments of raw materials by gondola rail car or river barge are now being covered with polyethylene film to protect against moisture.

If an operation is conducted in the open air and weather is cold or stormy, a temporary polyethylene housing over the whole process, or part of it, can keep the operators warm and dry. As a matter of fact, this film is extensively used in new construction to wall in entire buildings as a protection for workers during the winter. A chemical plant can put it to the same use, not only during construction or maintenance work, but perhaps after a small explosion or fire leaves a building partly exposed.

MORE

Pulmonary Edema Treated Successfully With Alcohol

Pulmonary edema, an acute and often fatal fluid congestion of the lungs, which sometimes occurs immediately after surgery, is reported to be treated successfully with ethyl alcohol vapor.

This development was reported in an article entitled, "Alcohol Inhalation in the Treatment of Acute Pulmonary Edema in the Immediate Post-Operative Period."* In most of the cases described, inhalation of 95% ethyl alcohol vapor produced immediate and dramatic recovery, with no apparent harmful effect.

In relieving pulmonary edema, ethyl alcohol reportedly reduces surface tension and acts as an anti-foaming agent. In severe cases of edema, foam is formed in the respiratory passages, interfering with oxygenation. This suffocation in turn increases the formation of foam. The alcohol vapor interrupts this vicious cycle by modifying the surface tension of the fluid, thereby reducing the amount of foam and permitting oxygen to enter the lungs to further alleviate the condition.

The vaporized alcohol can be administered with standard anæsthesia equipment, available in all operating rooms. Because most cases of pulmonary edema occur during or immediately after surgery, the convenience of this method of administering the alcohol contributes greatly to the success of the new technique.

*R. Weyl, Illinois Medical Journal, *108*, No. 5, November (1955).

Extra-wide polyethylene film can serve as a temporary protective cover for materials or equipment.

June 30 ★ **U.S.I. CHEMICAL NEWS** ★ 1956

CONTINUED

Polyethylene

And where a pipe starts leaking at an upper level, a polyethylene tent over a working area below can protect personnel until repairs can be made.

In the pilot plant or laboratory, perhaps two or three investigations are being carried out in the same room, and dust from one threatens to contaminate the other. A temporary polyethylene room divider can be quickly installed to separate the activities.

Lines Kettles and Bins

There are also the many short-term lining services that polyethylene can perform to prevent materials from becoming contaminated, to save wear and tear on equipment, or to make ordinary vessels temporarily do the work of corrosion resistant equipment — such as lining pilot plant kettles for a special job involving corrosive materials, or lining bins containing dry materials to protect against moisture.

Because polyethylene film is light, tough, flexible, easy to handle, and inexpensive, and because it keeps out cold and moisture and lets in light, its potential applications in the chemical industry — now that it can be obtained as a wide film — are almost limitless. Plant, and especially pilot plant supervisors, would do well to keep this film in mind as a possible way out of some of those inevitable emergency situations.

While U.S.I. does not supply the film, it does make polyethylene resin, from which the film is made. Your Editor is anxious to hear of cases where you have been able to put polyethylene to work in your chemical process.

Plastics Exposition In New York This June

New York City's brand new Coliseum will play host to the 7th National Plastics Exposition, June 11-15, 1956. Over 225 individual companies plan to exhibit their products to an expected 20 000-plus crowd. U.S.I.'s PETROTHENE® Polyethylene resin will be featured in Booth 710 located near the southwest corner of the second floor. Also exhibited will be "U.S.I. Isosebacic" acid, a promising intermediate for many plastic uses. Technical and sales personnel familiar with both the polyethylene and the "U.S.I. Isosebacic" acid, as well as those familiar with other U.S.I. solvents of interest to the plastics industry, will be in attendance at the booth. They will be ready to discuss these products with plastics manufacturers and users.

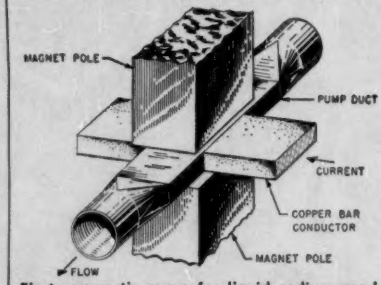
Sodium Pump Has No Moving Parts

For its work with liquid metals, the Atomic Energy Commission has sponsored development of several types of electromagnetic (EM) pumps for moving liquid sodium and the sodium-potassium alloy known as NaK.

Operation of these pumps is based on the high electrical conductivity of sodium. An EM pump operates on the same principle as an electric motor, but instead of iron moving in an electric field the sodium moves in a similar electric field. Thus, the sodium stream acts as the moving part of the motor and it is pumped forward.

Advantages of electromagnetic pumps are: they can be totally sealed; have no moving parts; can be mounted in any position; permit easy flow control. Both a.c. and d.c. types are used, depending on the application.

Sodium can, of course, be transferred by other methods, as described in U.S.I.'s recent booklet, "Handling Metallic Sodium on a Plant Scale." It can be transferred by vacuum, by positive displacement pumps, or by centrifugal pumps — and the final choice will depend on specific operating conditions.



Electromagnetic pump for liquid sodium needs no seal. Simple d.c. Faraday type is shown.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

A starting fluid for diesel and gasoline engines now comes in a pressurized can. Designed for cold or damp weather, the product reportedly gives quick, sure starts down to 65° below 0°F., can withstand heat up to 180°F. safely. **No. 1150**

A polyethylene glue dispenser resembling a pen has just been introduced in this country. The new unit will release one dot of rubber cement at a time, holds 5000 dots. Like a pen, it can be refilled with a disposable cartridge. **No. 1151**

Alcohol and solvent users can now obtain wall charts for determining the contents of 55-gallon drums at various temperatures by stick measurement. They are useful for making approximate measurements with minimum effort. **No. 1152**

A high-temperature pressure gauge has been developed, reputed to give continuous accurate readings under long exposure to high heat and radiation. It is manufactured in a wide variety of materials to resist any liquid or gas. **No. 1153**

A new C-18 unsaturated fatty diol is offered commercially as an intermediate for cosmetics, polyester modifiers, surfactants, quaternary derivatives. The compound has 1 double bond, OH groups on the 1st and 12th carbon atoms. **No. 1154**

A small hand pump made entirely of polyethylene is now marketed which delivers a gallon of liquid in a few seconds. It is chemically inert and very durable mechanically. The pump comes in various barrel lengths and mountings. **No. 1155**

A sodium alloy slug to prevent oxidation of motor oil has been placed in an air-and-water-free fitting in the line ahead of the oil filter. It is claimed that cars fitted with this device have gone 20,000 miles without oil deterioration. **No. 1156**

Heavy rare earth oxides in purities to 99.9% are now available in substantial quantity. Included are yttrium, samarium, gadolinium, ytterbium, dysprosium, erbium, thulium. Large uses have been found in metallurgy, optical polishing. **No. 1157**

An amine-type hardener for epoxy resins, recently announced, permits clear castings of up to 40 lb. in a single pour. Used at 15:100 parts by weight of epoxy, resulting resin may be cured at 140-200°F. in up to 15 hrs. **No. 1158**

Polyethylene plugs to protect holes during finishing of metal parts are now being made in all standard tap sizes from No. 1 to ½ in. The plug is removed after surface finishing, leaving a clean hole of the original dimension. **No. 1159**

Titanium dioxide users, who, just about six months ago, were hamstrung for supplies because of the generally acute shortage, are breathing much easier now. Fact is, reports in the trade indicate that dioxide supplies are fairly adequate. (And titanium, too, is more readily available now than it has been.)

This doesn't mean, of course, that all titanium dioxide producers are certain that the long-tight titanium dioxide situation is definitely over—plans for expansion are still being carried forward (*CW Market Newsletter, Dec. 17, '55*).

New Jersey Zinc, which last month acquired American Cyanamid's Gloucester (N. J.) titanium pigments plant, will enlarge facilities there to up the capacity, now somewhat over 20,000 tons/year. Also in the works: a new titanium dioxide plant.

Although slowing demand for dioxide from some outlets (paints, floor coverings) is contributing to the easing of the market, few observers expect any immediate downward revision in the pigment's price.

Down, however, are prices on some phosphors used by the television industry. Tungsten and Chemical (division of Sylvania Electric Products) has posted reductions in black-and-white television picture tube phosphors. Price (in standard 5-lb. bottles), for example, is down to $10/lb., compared with the previous $11.75.

This and similar reductions for other packaging, says the company, are made possible by "improved equipment . . . manufacturing efficiencies . . . increased volume of phosphors business."

•

World production of man-made fibers reached an all-time record last year. The tally: some 5.6 billion lbs., a 14% increase over '54's 4.9 billion. That's the latest word from a survey carried in the Textile Economics Bureau's *Textile Organon*.

Additional data: The '55 total includes 4.5 billion lbs. of rayon, 484 million lbs. of acetate, 562 million lbs. of noncellulosic man-made fibers. Rayon output increased 12½% above the previous year's, and acetate production was up 7%; the noncellulosics jumped a hefty 35½%, with the U.S. accounting for 67½% of the '55 noncellulosic total, compared with 69% in the previous year.

How are the Iron Curtain countries doing in relation to the U. S.? *Organon* candidly admits that rayon and acetate production and capacity data for the Soviet Union and its satellites are estimates, but the comparisons are interesting.

Last year, the Russian sphere (Czechoslovakia, East Germany, Hungary, Poland, Romania, U. S. S. R.) turned out some 205 million lbs. of filament yarn and 495 million lbs. of staple. (The 700-million-lb. total, for the purpose of compilation, is considered as regular tenacity rayon yarn and/or

rayon+tow, although it is known that high-tenacity rayon yarn, cuprammonium rayon and acetate are also produced in the filament yarn and staple forms.)

The U. S. output of filament yarn in '55 was slightly over 865 million lbs., while staple production ran to almost 396 million lbs. The latter was second only to Japan's world-leading 536 million lbs.

•

Japan, too, is high-stepping along in the synthetic resin field. Because of "an unexpectedly large increase in domestic requirements," the Japanese Ministry of Trade is drastically revising upward its five-year plan for resin production. The original plan, which was to cover 1955-59, has been altered to apply to 1956-60. Production target has been raised from a previous 157,400 tons/year by '59 to a new goal of 213,800 tons/year by 1960.

Output during the 1955-56 "financial year" totaled 99,844 tons, 20% higher than the estimate made at the beginning of the year. Chief reason for the increase: impressive demand for urea resin and vinyl chloride, which together account for 70% of total resin production.

•

The drop last week in spot prices on copper cyanide isn't being hailed as a forerunner of other copper chemical reductions. The 3¢/lb. cyanide cut (across the board) is a direct result of lower prices on copper scrap and custom smelter material.

Copper prices on the world market, incidentally, are still being held below domestic producers' 46¢/lb. (delivered in the U. S.), and the discrepancy is said to be a contributing factor to the metal's market unstability.

•

Final form of the ethical business practice rules for the melamine dinnerware industry has been okayed by the Federal Trade Commission. The new quality standards (*CW, June 16, p. 57*) will guide the trade in avoiding illegal advertising, pricing, and other marketing practices.

Sparked by the Society for the Plastics Industry, the melamine rules will ban false guarantees, trademark infringements, fictitious price lists, disparagement of competition, sales below cost, substitution of products, and other misleading or deceptive representations.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending June 25, 1956

	Change	New Price
UP		
Blood, dried, high grade, ungrd., 16-17% ammonia, bgs., Chicago, unit-ton	$0.25	$5.25
Carnauba wax, yellow No. 1 ceara, bgs., ton-lots, lb.	0.08	1.38
DOWN		
Copper cyanide, tech., bbls., 20,000-lb. lots or more, lb.	$0.03	$ 0.775
Mercury, 76-lb. flask, net-flask	1.00	258.00

"DO-IT-YOURSELF" CAUSTIC SODA

A new process using Glycerine, still in the laboratory stage, shows promise of solving a by-product recovery problem in the chemical industry.

For every ton of fiber produced by rayon manufacturers, more than a ton of sodium sulfate is produced. At the same time, rayon plants consume large amounts of caustic. In the past, chemists have tried unsuccessfully to find an *economical* way of converting sulfate into much-needed caustic.

Recent experiments have shown that significantly higher yields of caustic soda may be obtained by treating sodium sulfate with slaked lime—*in Glycerine solution.*

The new process takes advantage of Glycerine's solvent and dispersing abilities. Continuing research with these properties of Glycerine may uncover practical by-product recovery processes of a similar nature for still other industrial chemicals. The unique balance of properties that has won such wide acceptance for Glycerine in the past continues to open new doors to chemical progress. In paints, foods, pharmaceuticals, packaging . . . for tomorrow's surge of new specialties . . . in formulations and reactions yet unknown, nothing takes the place of Glycerine.

This balanced group of properties keeps **Glycerine's** usefulness growing

HYGROSCOPICITY • STABILITY • HUMECTANT •
SOLVENT POWER • VISCOSITY • NONVOLATILITY • CARRIER • SOLVENT • LUBRICANT • SOFTENER •
NONTOXICITY • TASTE • MW/HYDROXYL RATIO • EMOLLIENT • ANTI-FREEZE • ALKYD BASE •

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Plastic Dishware

Two of the trends that are

Brisk New Specialties

Chore for Perborates

Nobody's deriving more satisfaction from the vigorous new sales push for melamine plastic dinnerware than the makers of the stain-removing specialties for such dishes. While big resin producers like Barrett Division (of Allied Chemical) and American Cyanamid try to pump melamine-based dinnerware sales up to the 105-million pieces mark this year—it means sales of 30-35 million lbs. of resin for them (*CW, June 16, p. 57*)—manufacturers of the stain removers are riding coattail-fashion to higher sales, too.

Net result, for makers of the cleaners, is product sales volume estimated to approach 2 million lbs./year (for both home and institutionally used material). And, though aimed specifically at plasticware, the cleaners are also finding a place as cleaning compounds for coffee makers of all types —glass, steel, aluminum.

Bleach Brother: Somewhat akin in formulation to the light-duty dry bleach compounds, the stain removers are based on the so-called "perborates" —more accurately, sodium borate perhydrate. Currently marked products are made with the sodium borate monohydrate ($NaBO_3 \cdot H_2O$, Perdox) made by Du Pont and sold for about 30¢/lb. Dry bleaches generally use the tetrahydrate, produced by Becco Division of Food Machinery and Chemical Corp., as well as by Du Pont.

Only three formulations on the market now get a boost from the resin makers.* These are Dip-It (made by Economics Laboratory, St. Paul, Minn.), Maid-Easy Coffee Stain Remover or M-E Cleaner (made by Maid-Easy Cleansing Products Corp. Mount Vernon, N.Y.) and Reen'o (Reen'o Sales Corp., St. Louis, Mo.).

These materials get the nod from dinnerware makers because they can remove stains without affecting the surface finish of the dishes. Chlorine bleaching materials—wet or dry—take off the stain, but they frequently etch the dish surface in the process. Abrasive scouring powders do the same sort of damage.

Home and Industry: Though trade sources aren't in full agreement, consensus is that the majority of the stain removers are now sold to institutional users, rather than to the housewife.

*These are products for hand-washing dishes. For regular machine washing, two other products are suggested by American Cyanamid—Economic's Finish, and Calgon, Inc.'s (Pittsburgh) Thanx.

Holding down use of these compounds somewhat, both industrially and in the home, is the fact that they are not required for daily dishwashing. Standard dishwashing detergents are satisfactory for regular cleaning of plasticware and coffee makers—these special materials are called upon only when dishes become stained.

Second Chore: In an effort to expand consumption, Maid-Easy, for one, suggests that its product be used to bleach fabrics such as nylon and Orlon.

The stain removers contain considerably more perborate than do most light-duty household dry bleaches, are a little higher priced (16-oz. can of Maid-Easy retails for about $1). In the stain removers, the formulas average about 35% perborate, provide about 5% available oxygen. Many typical home bleaches release about 1.5% available oxygen, often supplement bleach with optical whiteners.

As things stand now, the bleaches far outsell their cousins, the stain removers. Nonetheless, the stain removers have an expanding potential—estimates are that $65-70 million worth of melamine dishware will sell this year—and the durability of the dishes indicates that once a family buys the plasticware, it will have a continuing need for the specialty cleaners.

Copper Utensils

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Rub Out of Polishes

While the success of plastic dinnerware has been dependent upon the introduction of suitable new compounds such as the melamines and ureas, copper kitchenware owes its success not to novel materials, but to its excellent heat-conducting properties, its handsome appearance.*

But like plastic, copperware must be carefully maintained to be shown to best advantage, and here again has developed a tempting market for special cleaners. The general trend toward cleaners of this nature and an idea of this market can be seen by a glance at Copper Brite, introduced half a dozen years ago by Copper Brite, Inc. (Los Angeles). About 10 million bottles of this material were sold last year, according to the company.

Tussle for the Top: Several firms now claim the top sales spot. Indications are that the largest selling dry powder is Cameo Copper Cleanser (made now by B. T. Babbitt, since its acquisition of Cameo and the latter's Chicago plant). Samae, made by Copper Clad Products (Newark, N. J.) and recommended by Revere for use on its products, is likely the liquid giving Copper Brite its hardest competition—it's sold as a powder, too.

That there's plenty of room for other products is plainly shown by the sturdy sales of several products of various types. Besides the ones mentioned, top selling powder cleaners include Click Chemical Corp.'s (New York) Click 88; Commonwealth Home Products, Inc.'s (Kalamazoo, Mich.) Copper Glo; Kleen King Home Products Co.'s (Burbank, Calif.) Kleen King. An imported polish, Red Bear Powder, made by Lindahl's Manufacturing Co. (Stockholm, Sweden), also sells well.

Leading liquids, creams or pastes include Atlantis Sales Corp.'s (Rochester, N.Y.) Brasso (liquid), Clipper Products' (Chicago) All Metal (cream), Drackett Co.'s (Cincinnati) new Twinkle, Korex Co.'s (Detroit) Korex Copper Cleaner (paste), Ecko's Copper-Brass Cleaner (paste), Noxon of New Jersey's (Newark) Noxon. Viking-Sloane's chemically impregnated "mitt" has scored heavily, saleswise.

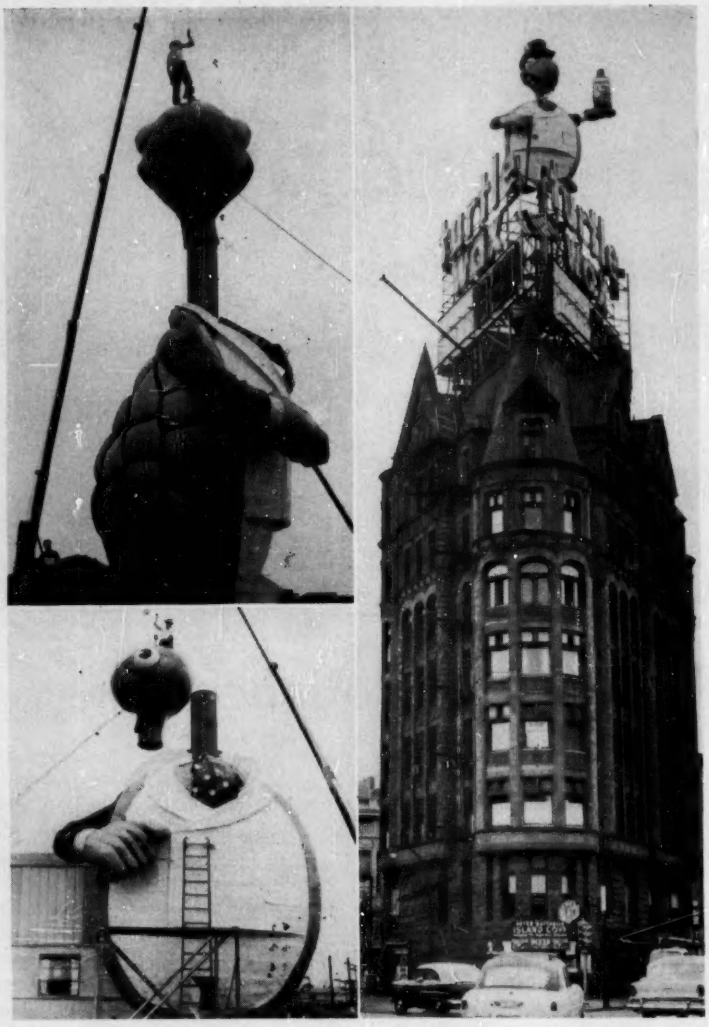
Ease of Use: Important part of the sales success of the copper shiners has been the emphasis on making them part of standard care for kitchen utensils. The trend seems to be to make the polishes simple to use—little rubbing needed—safe, and without the harsh odor and action that has typified many brass polish formulations.

The powder materials appear to slip into their kitchen role easily—they are much like the standard household scouring powders. These also rate well on a low-initial-cost basis—most firms sell about eight ounces of powder in a shaker-top can for under 30¢ (Red Bear is relatively high—18 oz. for $1.39). Liquids vary greatly in price—Noxon sells eight ounces for 21¢, Copper Brite for 89¢.

Recipe Note: Unlike the plasticware cleaners, the copper polishes don't rely on any novel ingredient, such as the perborates. The general components have been around for years. Though acid-containing liquids cost more than powders in many cases, they're generally agreed to act faster than the dry materials, which depend largely upon abrasive action.

Right now, competition in the field of copper cleaners is rough—an unsatisfactory product soon stops selling. Despite the expanding sales of copperware reported by producers such as Ecko and Revere, specialties makers have found it no snap to build big sales.

*Also contributing to the success of the copperware has been its use in combination with such alloys as stainless steel. Modern copperware is an expensive product sold largely in metropolitan areas.



Turtle Takes to the Air

SPECTACULAR new sign for Plastone-Turtle Wax Co. (Chicago) was unveiled last week in Chicago at the intersection of Madison, Ashland, and Ogden avenues. The 34-ft., 15,000-lb steel-and-plastic turtle, Plastone's trademark, not only plugs the firm's polish products (and their "hard shell" finishes), but indicates the weather forecasts: turtle's back is red to show warm weather ahead; blue to indicate cold; white to signify rain or snow; green to show no change.

The big model rotates above an illuminated base that tells time and temperature—and the whole device, atop a 10-story building, is claimed to be world's largest three-dimensional sign. Victor Sign and Display Co. (Chicago) designed the giant sign, which Multiplastic Co. (Addison, Ill) built from 3,200 lbs. of glass fiber and 10,000 lbs. of structural and fabricated steel. Several days were required to assemble the $200,000 mock turtle atop the building; the unveiling required a full day of ceremony.

EXPANSION

Packing Place: Extra space for its packaging operations has been acquired in Newark, N.J., by Pack It, custom packer of cosmetics and chemical specialties. About 125 will be employed at the new facilities, which will be opened in a few weeks.

•

Drug Maker: Add a new firm to the list of drug makers: Pharmco, Inc. (Cleveland). The new company manufactures, tests, and packages drugs on a custom basis.

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Atlanta Addition: Zep Manufacturing Co. (Atlanta, Ga.) is planning a $750,000-addition to its home plant. The firm, producing sanitary and maintenance chemicals, will put up a two-story structure on an eight-acre site in Atlanta's Chattachoochee industrial area. Both laboratory and manufacturing facilities will be included in the new plant.

PRODUCTS

Anti-Algae: Naugatuck Chemical Division, U.S. Rubber Co., is now pushing its Phygon-XL fungicide (chemically, 2,3-dichloro-1-naphthoquinone) as an anti-algae agent. Suggested to prevent green scum from forming in ponds, the chemical is claimed harmless to fish. One application of about ½-1 lb. of the fungicide per acre of pond surface is said to keep it free of blue-green algae for a summer (green algae requires 4-5 pounds; 15 lbs. will control a water weed known as milfoil, but it will also kill fish).

•

Cleaner-Germ Killer: A combination hand cleaner and germicide is now marketed by Landon Laboratories (Kansas City, Mo.) under the name Speed-Kleen. The compound contains bithionol (Monsanto's Actamer) and lanolin, is said to remove from the hands such stains as carbon paper smudges, typewriter inks, ditto inks, greases.

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Broad Application: Fidelity Chemical Products Corp. (Newark, N.J.) is selling a new multipurpose lacquer for metals. Tagged Clear Universal Lacquer #100, it is said to provide a protective, adherent coat for all types of metals.

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